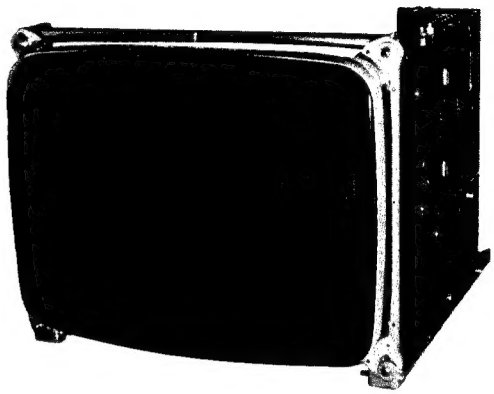
Service Manual

Color Computer Monitor

MODEL TX-1441AE

Chassis No. X54



CONTENTS

Panasonic

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

SAFETY PRECAUTIONS

1 CAUTION

No modification of any circuit should be attempted. Service work should only be performed after you are thoroughly familiar with all of the following safety checks and servicing guide lines.

2 SAFETY CHECK

Care should be taken while servicing this CRT display because of the high voltage used in the deflection circuits. These voltages are exposed in such area as the associated flyback and yoke circuits.

3 FIRE & SHOCK HAZARD

3-1 Insert an isolation transformer between the CRT display and AC power line before servicing the chassis.

3-2 In servicing pay attention to original lead dress especially in the high voltage circuit. If a short circuit is found, replace all parts which have been overheated as a result of the short circuit.

3-3 All the protective devices must be reinstalled per original design.

3-4 Soldering must be inspected for possible cold solder joints, frayed leads, damaged insulation, solder splashes or sharp solder points. Be certain to remove all foreign material.

4 LEAKAGE CURRENT COLD CHECK

4-1 Unplug the AC cord and connect a jumper between the two prongs on the plug.

4-2 Turn the CRT display power switch "on"

4-3 Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metallic part on the CRT display such as the metal frame screwheads, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be 1.8 megaohm minimum

5 LEAKAGE CURRENT HOT CHECK

5-1 Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during this check.

5-2 Connect a 1500 ohm, 10 watt resistor, paralleled by a 0.15μF capacitor between each exposed metallic part and a good earth ground (as shown in Figure 1).

5-3 Use an AC voltmeter with 1000 ohm/volt or more sensitivity and measure the AC voltage across the combination 1500 ohm resistor and 0.15μF capacitor.

5-4 Move the resistor connection to each exposed metallic part and measure the voltage.

5-5 Reverse the polarity of the AC plug in the AC outlet and repeat the above measurement.

5-6 Voltage measured must not exceed 7.5 volt RMS, from any exposed metallic part to ground. A leakage current tester may be used in the above hot check, in which case any current measured must not exceed 5.0 milliamp. In the case of a meaurement exceeding the 5.0 milliamp value a rework is required to eliminate the chance of a shock hazard.

Note: High voltage is present when this CRT display is operating. Always discharge the anode of the picture tube to the display chassis to prevent shock hazard.

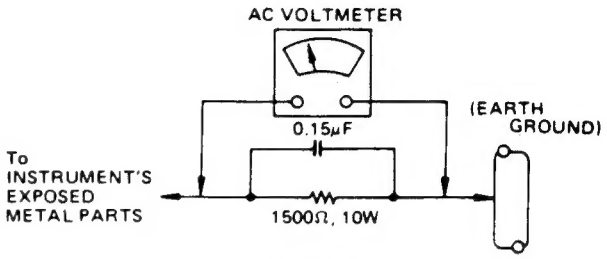


Figure 1

6 IMPLOSION PROTECTION

All Panasonic picture tubes are equipped with an integral implosion protection system, but care should be taken to avoid damage and scratching during installation. Use only Panasonic replacement picture tubes.

7 X-RADIATION

WARNING: The only potential source of X-Radiation is the picture tube. However when the high voltage circuitry is operating properly there is no possibility of X-Radiation problem. The basic precaution which must be exercised is to keep the high voltage at the following factory-recommended level.

Note: It is important to use an accurate periodically calibrated high voltage meter.

7-1 To measure the high voltage, use a high impedance high voltage meter, connect (−) to chassis and (+) to the CRT anode button.

7-2 Turn the Brightness control fully counterclockwise.

7-3 Measure the high Voltage. The high voltage meter should indicate at the following factory-recommended level.

7-4 If the upper meter indication exceeds the maximum level, immediate service is required to prevent the possibility of premature component failure.

7-5 To prevent X-Radiation possibility, it is essential to use the specified picture tube.

7-6 The nominal high voltage is 25KV and must not exceed 27.5K at zero beam current at rated voltage.

IMPORTANT SAFETY NOTICE

There are special components used in Panasonic CRT displays which are important for safety. These parts are identified by the international symbol ⚠ on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent X-RADIATION, shock, fire or other hazards. Do not modify the original design without written permission of the Panasonic Industrial Company or this will void the original parts and labor guarantee.

SPECIFICATIONS

1. SCOPE

The purpose of this specification is to describe the frame type color display monitor which is able to function for MULTI modes.

1.1 FEATURES

(1) This monitor all frequencies between 15.5 kHz and 36 kHz.
(2) It is compatible with the IBM PC, PC/XT, PC/AT, PS2 and look-alikes.
(3) It is compatible the IBM Color Graphics Adapter, the IBM Enhanced Graphics Adapter, the IBM Professional Graphics Controller and other IBM compatible graphics adapter.
(4) The swivel base allows adjustment of the vertical angle and horizontal direction of the monitor to the most suitable position.
(5) It offers both TTL and ANALOG signal inputs, and in the ANALOG mode can display an unlimited palette of colors depending on the graphics board and software being used.

1.2 PANASYNC SPECIAL FEATURES

(1) PANASONIC World-famous technology, SST DY improves greatly, misconvergence and distortion.
(2) 2-WAY 16 Colors
2 kinds of 16 colors available, Yellow colored 16-colors, and Brown colored 16-colors.

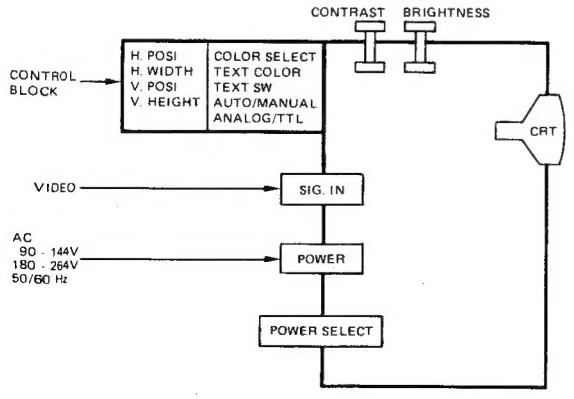
2. MECHANICAL DESCRIPTION

2.1 Dimensions

Height : 279 mm (11.0") typ.
Width : 330 mm (13.0") typ.
Depth : 408 mm (16.1") typ.
Net weight : 12.2 kg typ.
(Monitor only)

3. CONSTRUCTION

3.1 Outline



3.1.1 Auto/Manual switch

This switch selects either the IBM mode when AUTO or the manual mode when MANUAL.
When this switch is AUTO, MONITOR automatically works in the IBM mode and adjusts itself to the scanning frequency, resolution and color requirements of the IBM compatible graphics adapter CGA/EGA/PGC being used.
When this switch is MANUAL, the user must manually select the number of colors (8/16/64) needed by the graphics adapter being used with the COLOR SWITCH (see 3.1.3 below).
Refer to instructions accompanying the graphics adapter being used for information on how many colors the adapter can display.

3.1.2 Color switch

The three color configurations (8/16/64) necessary when using non-IBM compatible graphics adapters can be set using No. 1 and 2 of the dip switches as shown below. Refer to instructions accompanying the graphics adapter being used for information on how many colors the adapter can display.

Color Mode	DIP SWITCH (SW1303)	
	No. 1	No. 2
8 Colors	OFF	OFF
16 Colors (Yellow)	ON	OFF
16 Colors (Brown)	OFF	ON
64 Colors	ON	ON

Note :
These switches should be set correctly in relation to the input signal of the graphics adapter being used. Refer to instructions accompanying the graphics adapter for information on the input signal and refer to No. 3.1.4 below.

3.1.3 TTL/ANALOG switch

Used to select an input video signal-either TTL or ANALOG - of the graphics adapter. It is important to determine whether the input signal of the graphics adapter being used is ANALOG or TTL prior to connecting the adapter with your personal computer. Refer to instructions accompanying the graphics adapter for information on the input signal.

3.1.4 Text switch

This switch controls the text mode of MONITOR.

When it is ON, the text of the display will appear in one color selected by the TEXT COLOR SWITCH (No. 3, 4 and 5 of the dip switch on the REAR of MONITOR), regardless of the colors of the software program being used.

When it is OFF, the color of the software program being used will again be displayed.

The diagram below of the dip switches shows how to display text in your choice of seven colors.

TEXT COLOR	DIP SWITCH (SW1303)		
	3 R	4 G	5 B
RED	ON	OFF	OFF
GREEN	OFF	ON	OFF
BLUE	OFF	OFF	ON
YELLOW	ON	ON	OFF
CYAN	OFF	ON	ON
MAGENTA	ON	OFF	ON
WHITE	ON	ON	ON

NOTE :

The text switch works only in the TTL mode.

3.2 CRT characteristis

Size : 33 cm (14 inch) diagonal
Matrix : Black opaque material
Matrix type : Negative guard band
Faceplate type : Contrast enhancement, Direct Etched
CRT type No. M34JDJ80X
Phosphor : P22
Persistance : Short
Array : Dot trios
Trio pitch : 0.31 mm typ. at center

4. ELECTRIC PERFORMANCE

4.1 Power Supply

Input voltage : AC 90 - 144V/180 - 264V
Input frequency : 48 ~ 62 Hz
Input current : 0.8A max. (at 230V AC)
Power : 90W max.

4.2 Input signals

VIDEO	TTL level positive Analog 0.6V p-p/75Ω positive
SYNC.	Separate sync. TTL level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative
	Composite sync. TTL level Positive/Negative
	Composite sync. On green video Sync. 0.3V p-p Negative (Video 0.6V p-p positive)

4.3 Synchronization

Horizontal ..... 15.5 to 36 kHz
Vertical ..... 50 to 100 Hz

4.4 Signal timing

See page 9.

4.5 Video out

Amplifier response

The video amplifier shall produce a drive signal at the cathodes of the CRT of sufficient amplitude to produce a spot luminance of maximum luminance (R_A, G_A, B_A, R_B, G_B, B_B = H), with rise and fall times of less than 30 nsec from 10% to 90% pulse level.

5. OPTICAL CHARACTERISTICS

5.1 Image test condition

Character : All "H" character
Color : Green 2/3 level
Brightness controls : Max. (without background)
Contrast control : Max.
View direction : Parallel to the CRT axis
Ambient Temperature : Room temperature
Supply voltage : AC 230V, 50 Hz
Terrestrial magnetism : Horizontal field ..... 0 Gauss
Vertical field ..... 0.4 Gauss
Mode : M2 signal
V. Position control : VR431 ..... Set to center of screen using VR431.

Note : All measurements shall be made under normal conditions after an intial warm-up time of more than 20 minutes.

Note : Normal conditions are these which satisfy image test condition.
(Condition of each following item is normal condition unless otherwise stated).
normal condition unless otherwise state

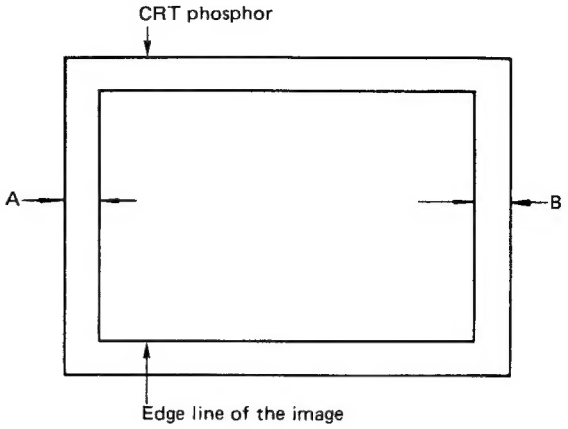
5.2 Image

5.2.1 Image size

Horizontal: 250 ± 5 mm (9.84 ± 0.2")
Vertical: 187.5 ± 5 mm (7.38 ± 0.2")
Testing condition is normal condition.

5.2.2 Image position

Image is within the area in figure 1.
IA – BI ≦ 4 mm (0.157")
Testing condition is normal condition.

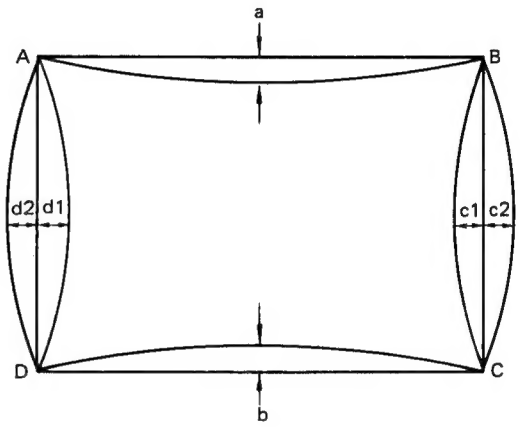


IA – BI ≦ 4 mm (0.157")

Figure 1

5.2.3 Distortion

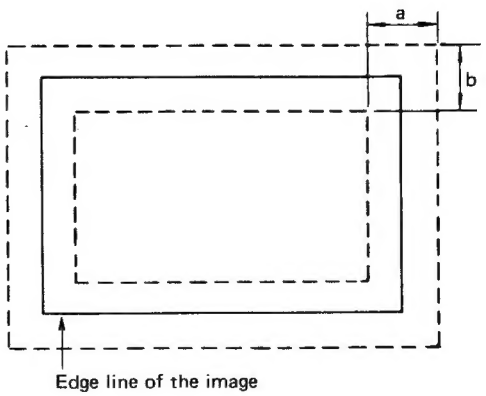
(A) Pincushion
See figure 2.
Upper (a) .... Less than 2 mm (0.079")
Lower (b) ... Less than 2 mm (0.079")
Right (c1 or c2) and Left (d1 or d2)
..... Less than 2 mm (0.079")
Input signal is a crosshatch pattern.
Other conditions are as stated in 5.1 Image test condition.



a, b ≦ 2 mm (0.079")
c1, c2 ≦ 2 mm (0.079")
d1, d2

Figure 2

(B) Rectangularness & Parallelogram distortion Edge of the image is within the area indicated by the dotted line in figure 3.
a ..... 4.5 mm (0.177")
b ..... 3 mm (0.118")
Input signal is a crosshatch pattern.
Other conditions are as stated in 5.1 Image test condition.



a .....4.5 mm (0.177")
b ..... 3 mm (0.118")

Figure 3

(C) Linearity

Horizontal and vertical linearity shall be less than 7%.

See figure 4.

Input signal is a crosshatch pattern. Other conditions are as stated in 6.1 Image test condition.

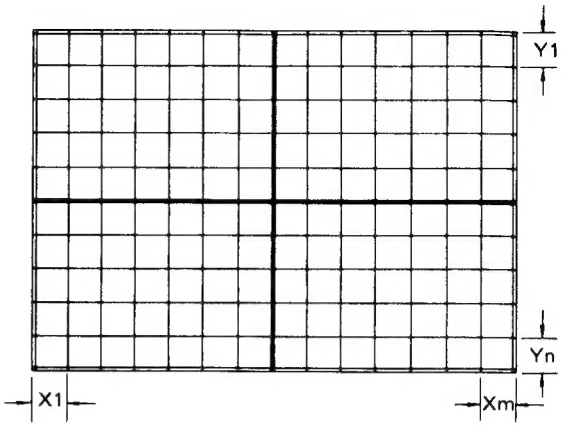


Figure 4

$$\text{HORIZONTAL LINEARITY} = \frac{X\,(MAX) - X\,(MIN)}{X\,(MAX) + X\,(MIN)} \times 100\,(X) \leqq 7\%$$

$$\text{VERTICAL LINEARITY} = \frac{Y\,(MAX) - Y\,(MIN)}{Y\,(MAX) + Y\,(MIN)} \times 100\,(X) \leqq 7\%$$

Maximum and minimum value should not be adjacent to each other

X (MAX) = Maximum distance between vertical lines from X1 to Xm

X (MIN) = Maximum distance between vertical lines from X1 to Xm

Y (MAX) = Maximum distance between horizontal lines from Y1 to Yn

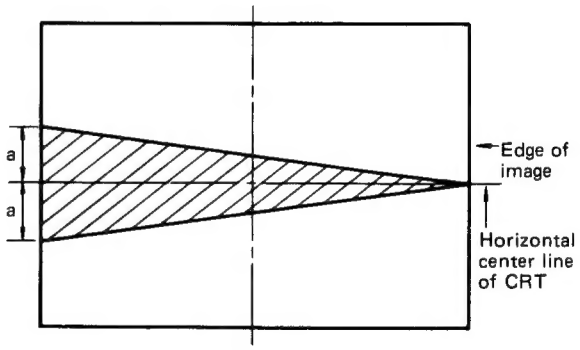
Y (MIN) = Maximum distance between horizontal lines from Y1 to Yn

(D) Rotation

Horizontal center line of the image shall be within the shaded area in figure 5.

a ..... 2 mm (0.079")

Input signal is a crosshatch pattern. Other conditions are as stated in 6.1 Image test condition.



a = 2 mm (0.079")

Figure 5

(E) Convergence

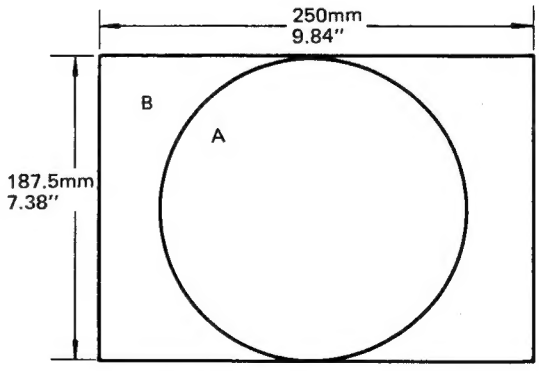
See figure 6.

Mis-convergence in area (A) $\leqq$ 0.3 mm (0.0118")

Mis-convergence in area (B) $\leqq$ 0.5 mm (0.0197")

Note: Should be measured under the following conditions.

1) Terrestrial Magnetism without horizontal field (0 Gauss).
   With vertical field of 0.4 Gauss
2) At room temperature
3) Input signal; Cross hatch R, G, B mixed colors.



area A $\leqq$ 0.3 mm (0.0118")

area B $\leqq$ 0.5 mm (0.0197")

Figure 6

5.3 Image size variation

Notes and test conditions	Image size variation from the normal image size
Rotation of brightness VR	Within 4 mm (0.157") (Horizontal and Vertical)
AC line voltage varied 180 to 264 volts (90 - 144V)	Within ± 4 mm (0.157") (Horizontal and Vertical)
External ambient temperature varied 25 ± 25°C	Within ± 4 mm (0.157") (Horizontal and Vertical)

Testing condition is normal condition.

6. OVERALL PERFORMANCE

6.1 Resolution

Horizontal ..... 810 Pixels
Vertical ..... 670 Pixels

6.2 Insulation

More than 100 MΩ
(Between AC line and chassis).

6.3 Jitter

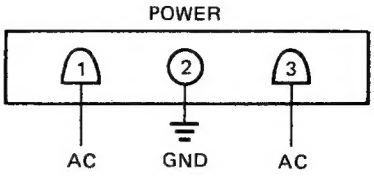
Less than 1 dot
Invisible at a distance of 45 cm (17.7") from CRT surface.

6.4 Moiré

According to the timing of input signal, there are possibillities of visible moiré.

7. CONNECTOR

7.1 Power connector



PIN NO. 1. AC (LIVE)
2. GND (F/G)
3. AC (NEUTRAL)

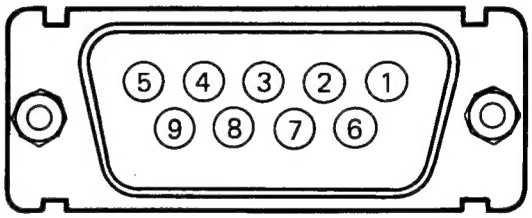
CONNECTOR	MONITOR	USER SIDE, See Note 1
POWER	Mfr. ..... A.M.P. 3P Cap (350767-1) Male contact (350561-1)	Mfr. ..... A.M.P 3P Plug (350766-1) Female contact (350570-1)

Note 1. --- User side connectors are just for your reference.

7.2 Signal connector

D-SUB TYPE 9P :
FEMALE PIN

SCREW : Inch Type



PIN ASSIGNMENT OF IBM GRAPHICS ADAPTOR

IBM ADAPTERS PIN ASSIGNMENT	COLOR GRAPHICS TTL 16 COLORS	ENHANCED TTL 64/16 COLORS	PROFESSIONAL GRAPHICS ANALOG
1	GROUND	GROUND	RED (NOTE 1)
2	GROUND	SECONDARY RED	GREEN (NOTE 1)
3	RED	PRIMARY RED	BLUE (NOTE 1)
4	GREEN	PRIMARY GREEN	COMPOSITE SYNC
5	BLUE	PRIMARY BLUE	MODE CONTROL
6	INTENSITY	SECONDARY GREEN/INTENSITY	RED GROUND
7	NON-CONNECTION	SECONDARY BLUE	GREEN GROUND
8	HORIZONTAL SYNC	HORIZONTAL SYNC	BLUE GROUND
9	VERTICAL SYNC	VERTICAL SYNC	GROUND

PIN ASSIGNMENT OF OTHER COMPUTERS

SIGNAL Pin Assignment	TTL			ANALOG		
	8 Colors	16 Colors	64 Colors	Separate Sync.	Composite Sync.	Sync. On Green
1	GROUND			RED (NOTE 1)		
2	.....		Secondary RED	GREEN (Note 1)		Green H/V Sync. (Note 2)
3	RED		Primary RED	BLUE (NOTE 1)		
4	GREEN		Primary Green	H. Sync.	H/V Sync.	.....
5	BLUE		Primary BLUE	V. Sync.	.....	
6	.....	Intensity	Secondary Green	GROUND		
7	.....		Secondary Blue			
8	H. Sync. / H/V Sync.					
9	V. Sync.					

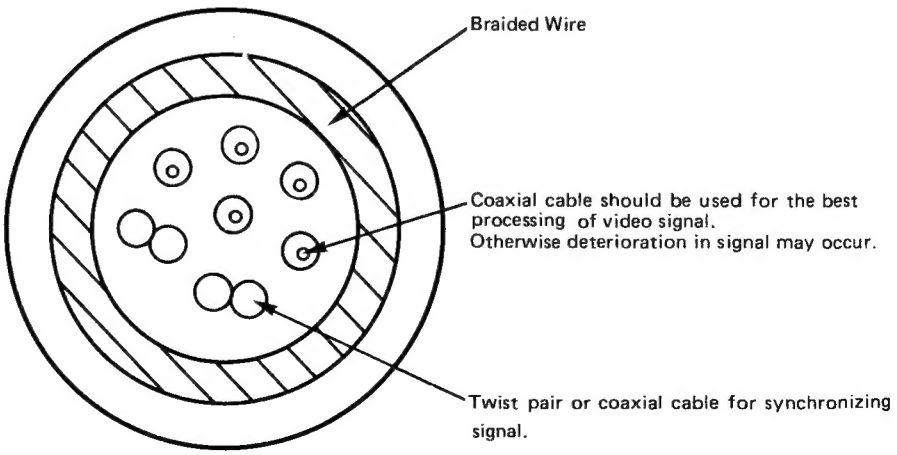
" ..... " means GROUND or NON-CONNECTION.
SIGNAL LEVEL
All signal level, except for those listed below, is TTL.
NOTE 1, means 0.6 V0-p (VIDEO)
NOTE 2, means 0.6 V0-p (VIDEO), 0.3 Vp-p (SYNC)

7.3 Signal cable

This monitor doesn't provide the signal cable. Please prepare a shield cable of the coaxial type to get the good image.

Necessary of sectional diagram of a signal cable

< An example >



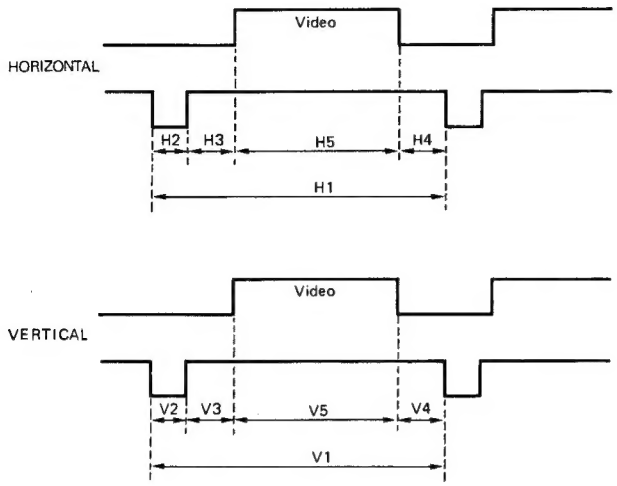
7.4 Standard signal timing (preset timing)

	EGA		PGC ANALOG	
	16 Colors	64 Colors	Low Resolution Mode (Mode L)	High Resolution Mode (Mode H)
PIXEL PERIOD	69.797 nSEC	61.51 nSEC	40.000 nSEC	40.000 nSEC
PIXEL RATE	14.3182 MHz	16.257 MHz	25.000 MHz	25.000 MHz
Horizontal Frequency	15.7 KHz	21.85 KHz	30.63 KHz	30.63 KHz
Line Time Total	63.66 μSEC	45.76 μSEC	32.647 μSEC	32.647 μSEC
ACTIVE	44.67 μSEC	39.4 μSEC	25.607 μSEC	25.607 μSEC
BLANKING	18.99 μSEC	6.36 μSEC	7.04 μSEC	7.04 μSEC
FRONT PORCH	7.26 μSEC	0 μSEC	0.20 μSEC	0.20 μSEC
SYNC PULSE	4.47 nSEC	3.94 μSEC	4.48 μSEC	4.48 μSEC
BACK PORCH	7.26 nSEC	2.42 μSEC	2.36 μSEC	2.36 μSEC
Vertical Frequency	60 Hz	60 Hz	60.06 Hz	60.06 Hz
Frame Time Total	16.67 mSEC	16.67 mSEC	16.650 mSEC	16.650 mSEC
ACTIVE	12.7 mSEC	16.02 mSEC	13.058 mSEC	15.670 mSEC
BLANKING	3.94 mSEC	0.64 mSEC	3.591 mSEC	0.979 mSEC
FRONT PORCH	1.59 mSEC	0 mSEC	1.404 mSEC	0.097941 mSEC
SYNC PULSE	0.19 mSEC	0.36 mSEC	0.065294 mSEC	0.065214 mSEC
BACK PORCH	2.16 mSEC	0.28 mSEC	2.122 mSEC	0.81618 mSEC
ACTIVE DOTS	640×200	640×350	640×400	640×480

NOTE :

1) SCANNING MODE ..... NON-INTERLACED
2) IMAGE DUTY 100%

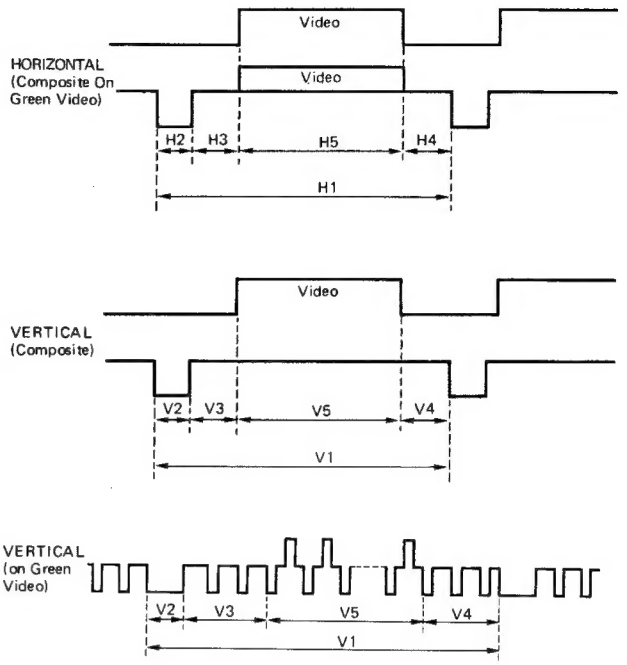
7.4.1 Signal Timing (Separate Sync)



Horizontal			
Frequency	(1/H1)	15.5 - 36	kHz
Line Time Total	(H1)	64.5 - 27.8	μsec
Blanking	(H2 + H3 + H4)		
	* Range 1 : $10 < \frac{H1 - H5 - 6.0}{H1}$ (μsec) x 100%		
	* Range 2 : $3 < \frac{H1 - H5 - 4.5}{H1}$ (μsec) x 100%		
Front Porch	(H4)	> 0	μsec
Sync Pulse	(H2)	> 1.5	μsec
Back Porch	(H3)	> 1.2	μsec
Sync + Back porch	(H2 + H3)	> 5.0	μsec
Vertical			
Frequency	(1/V1)	50 - 100	Hz
Frame Time Total	(V1)	20 - 10	msec
Blanking	(V2 + V3 + V4)	> 0.6	msec
Front Porch	(V4)	> 0	msec
Sync Pulse	(V2)	0.05 - 0.7	msec
Back Porch	(V3)	0.6 < V2 + V3	msec

* Note : Range 1 = 15.5 - 19 kHz
Range 2 = 19 - 36 kHz

7.4.2 Signal Timing (Composite Sync and Sync on Green Video)



Horizontal			
Frequency	(1/H1)	15.5 - 36	kHz
Line Time Total	(H1)	64.5 - 27.8	μsec
Blanking	(H2 + H3 + H4)		
	* Range 1 : $10 < \frac{H1 - H5 - 6.0}{H1}$ (μsec)		
	* Range 2 : $3 < \frac{H1 - H5 - 4.5}{H1}$ (μsec) x 100%		
Front Porch	(H4)	> 0	μsec
Sync Pulse	(H2)	> 1.5	μsec
Back Porch	(H3)	> 1.2	μsec
Sync + Back porch	(H2 + H3)	> 5.0	μsec
Vertical			
Frequency	(1/V1)	50 - 100	Hz
Frame Time Total	(V1)	20 - 10	msec
Blanking	(V2 + V3 + V4)	> 1.0	msec
Front Porch	(V4)	> 0	msec
Sync Pulse	(V2)	< 0.2	msec
Back Porch	(V3)	> 0.8	msec

Display colors

TTL Input ..... 8/16 (Yellow)/16 (Brown)/64 Colors
ANALOG Input ..... Unlimited Colors

Example of Color Function Table for TTL Input

EGA 16 Colors : Function Table
[Vertical Sync Polarity : Positive]

	16 Colors				Output Level			Color Level	Note 1	
No.	GB(I)	RA	GA	BA	R%	G%	B%		Cont.	Bright
1	0	0	0	0	0	0	0	Black	×	×
2	0	0	0	1	0	0	66	Blue	×	○
3	0	0	1	0	0	66	0	Green	×	○
4	0	0	1	1	0	66	66	Cyan	×	○
5	0	1	0	0	66	0	0	Red	×	○
6	0	1	0	1	66	0	66	Magenta	×	○
7	0	1	1	0	66	66	0	Brown	○	○
8	0	1	1	1	66	66	66	Light Gray	×	○
9	1	0	0	0	33	33	33	Dark Gray	○	○
10	1	0	0	1	33	33	100	Light Blue	○	○
11	1	0	1	0	33	100	33	Light Green	○	○
12	1	0	1	1	33	100	100	Light Cyan	○	○
13	1	1	0	0	100	33	33	Light Red	○	○
14	1	1	0	1	100	33	100	Light Magenta	○	○
15	1	1	1	0	100	100	33	Yellow	○	○
16	1	1	1	1	100	100	100	White	○	○

Note 1 : External control availability "O" means available
"X" means unavailable

EGA 64 Colors : Function Table
Vertical Sync polarity : Negative

No.	Input Video Signal						Relative Output Level			COLOR	Note 1	
	RB	GB	BB	RA	GA	BA	R%	G%	B%		Cont.	Bright
1	0	0	0	0	0	0	0	0	0	Black	x	x
2	0	0	0	0	0	1	0	0	66	L. L. Blue	x	o
3	0	0	0	0	1	0	0	66	0	L. L. Green	x	o
4	0	0	0	0	1	1	0	66	66	L. L. Cyan	x	o
5	0	0	0	1	0	0	66	0	0	L. L. Red	x	o
6	0	0	0	1	0	1	66	0	66	L. L. Magenta	x	o
7	0	0	0	1	1	0	66	66	0	L. L. Yellow	x	o
8	0	0	0	1	1	1	66	66	66	L. L. White	x	o
9	0	0	1	0	0	0	0	0	33	D. Blue	o	o
10	0	0	1	0	0	1	0	0	100	H. L. Blue	o	o
11	0	0	1	0	1	0	0	66	33		o	o
12	0	0	1	0	1	1	0	66	100		o	o
13	0	0	1	1	0	0	66	0	33		o	o
14	0	0	1	1	0	1	66	0	100		o	o
15	0	0	1	1	1	0	66	66	100		o	o
16	0	0	1	1	1	1	66	66	100		o	o
17	0	1	0	0	0	0	0	33	0	D. Green	o	o
18	0	1	0	0	0	1	0	33	66		o	o
19	0	1	0	0	1	0	0	100	0	H. L. Green	o	o
20	0	1	0	0	1	1	0	100	66		o	o
21	0	1	0	1	0	0	66	33	0		o	o
22	0	1	0	1	0	1	66	33	66		o	o
23	0	1	0	1	1	0	66	100	0		o	o
24	0	1	0	1	1	1	66	100	66		o	o
25	0	1	1	0	0	0	0	33	33	D. Cyan	o	o
26	0	1	1	0	0	1	0	33	100		o	o
27	0	1	1	0	1	0	0	100	33		o	o
28	0	1	1	0	1	1	0	100	100	H. L. Cyan	o	o
29	0	1	1	1	0	0	66	33	33		o	o
30	0	1	1	1	0	1	66	33	100		o	o
31	0	1	1	1	1	0	66	100	33		o	o
32	0	1	1	1	1	1	66	100	100		o	o
33	1	0	0	0	0	0	33	0	0	D. Red	o	o
34	1	0	0	0	0	1	33	0	66		o	o
35	1	0	0	0	1	0	33	66	0		o	o
36	1	0	0	0	1	1	33	66	66		o	o
37	1	0	0	1	0	0	100	0	0	H. L. Red	o	o
38	1	0	0	1	0	1	100	0	66		o	o
39	1	0	0	1	1	0	100	66	0		o	o
40	1	0	0	1	1	1	100	66	66		o	o
41	1	0	1	0	0	0	33	0	33	D. Magenta	o	o
42	1	0	1	0	0	1	33	0	100		o	o
43	1	0	1	0	1	0	33	66	33		o	o
44	1	0	1	0	1	1	33	66	100		o	o
45	1	0	1	1	0	0	100	0	33		o	o
46	1	0	1	1	0	1	100	0	100	H. L. Magenta	o	o
47	1	0	1	1	1	0	100	66	33		o	o
48	1	0	1	1	1	1	100	66	100		o	o
49	1	1	0	0	0	0	33	33	0	D. Yellow	o	o
50	1	1	0	0	0	1	33	33	66		o	o
51	1	1	0	0	1	0	33	100	0		o	o
52	1	1	0	0	1	1	33	100	66		o	o
53	1	1	0	1	0	0	100	33	0		o	o
54	1	1	0	1	0	1	100	33	66		o	o
55	1	1	0	1	1	0	100	100	0	H. L. Yellow	o	o
56	1	1	0	1	1	1	100	100	66		o	o
57	1	1	1	0	0	0	33	33	33	D. White	o	o
58	1	1	1	0	0	1	33	33	100		o	o
59	1	1	1	0	1	0	33	100	33		o	o
60	1	1	1	0	1	1	33	100	100		o	o
61	1	1	1	1	0	0	100	33	33		o	o
62	1	1	1	1	0	1	100	33	100		o	o
63	1	1	1	1	1	0	100	100	33		o	o
64	1	1	1	1	1	1	100	100	100	H. L. White	o	o

Note 1 : See Note 1 of prior page.

H. L. = High Light (Brighter)
L. L = Low Light
D = Dark

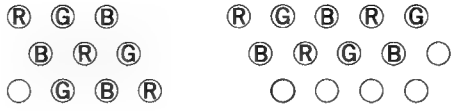
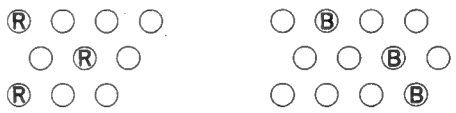
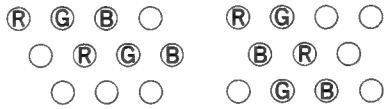
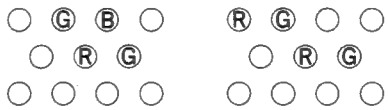
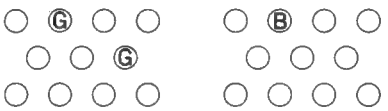
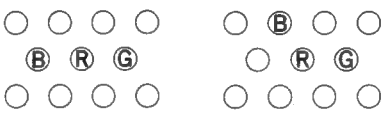
8. FAULT AND DEFECT CRITERIA

Zone			A	B	
Zone dimensions (mm)			127 × 178	Rest	
Permissible major defects	Air bubble (average diameter, mm)		More than 0.76	0.91~ 1.10	0.76~1.10
	Black spot, stain, hole and open air bubble (average diameter, mm)		More than 0.66	0.91~1.10	0.66~1.10
	Maximum permissible number	Each zone	0	2	3
		Total	3		
	Minimum allowable distance among defects (mm)		75	75	
Permissible minor defects	Air bubble (average diameter, mm)		0.50~0.75	0.50~0.75	
	Black spot, stain, hole and open air bubble (average diameter, mm)		0.50~0.65	0.50~ 0.65	
	Maximum permissible number	Each zone	5	9	
		Total	11		
Permissible defects any circle of 50 mm diameter	Air bubble (average diameter, mm)		0.50~0.75	0.25~0.75	0.25~0.75
	Black spot, stain, hole and open air bubble (average diameter, mm)		0.50~0.65	0.50~0.65	0.50~0.65
	Maximum permissible number		2	5	
	Minimum allowable distance among defects (mm)		3		
Elongated air bubble (permissible size)	Width (mm)		0.13~0.25	0.26~0.50	0.13~0.25	0.26~0.50
	Length (mm)		Less than 9.0	Less than 5.0	Less than 10.0	Less than 6.0

Note : 1) This is also applied to the distance to major defects.

2) This should be evaluated by its average diameter, and then relevant standards of air bubble are applied except maximum permissible number of each zone and minimum allowable distance among defects. (Even if the average diameter of elongated bubble exceeds that of major defects, this is treated as a permissible major defects.)

9. COLOR CRT PHOSPHOR DEFECTIVE STANDARD

Defective Level		Defect Phenomenon Item	Example	New Standard A. Q. L.	Min. spacing between
A	a1	Dot trio missed over 3 adjacent trios		0	- - - - -
	a2	Same color dots missed over 3 adjacent dots		0	- - - - -
B	b1	Dot trio missed 2 adjacents		0	- - - - -
	b2	2 dots missed out of 1 trio 2 adjacents trios		0	- - - - -
	b3	Same color dots missed 2 adjacent		1 defect × 3 colors	Between other color 20 mm
C	c1	1 trio missed		2	Between trio 20 mm
	c2	2 dots missed out of 1 trio		2	Between trio 20 mm
	c3	1 dot missed		Total 6 dots	Between same color dots 20 mm

Missing some portion of one dot	Definition (S)	Missing dot ← ◑ ❍ → OK -|L|- -|L|- L × 50% > a > L × 25%
	A. Q. L.	Less than 5 within the circle of 50 mm ϕ
Min. spacing between defect		20 mm
Total defects on one CRT		Less than 6 defects
Others		• Same as left • Below the spacing standard shall be judged again with adjacent standard.

10. ENVIRONMENTAL CHARACTERISTICS

10.1 Ambient temp., humidity and altitude

	Operating	Non-operating	Storage and shipment
Temp.	Note 0 to 50 degrees C	—40 to 65 degrees C	—40 to 65 degrees C
Humidity	5 to 90% no condensation	5 to 90% no condensation	5 to 90% no condensation
Altitude	3,000 m Max. (10,000 ft)	12,000 m Max. (40,000 ft)	12,000 m Max. (40,000 ft)

Note

***CAUTION : Installation to your system**

1) Never be hermetically shielded.
2) Give an appropriate ventilation (Air flow) to cool down the monitor below 50 degrees C in the worst case for the longer life.

Please keep them for the long life.

10.2 Vibration and Shock

10.2.1 VIBRATION

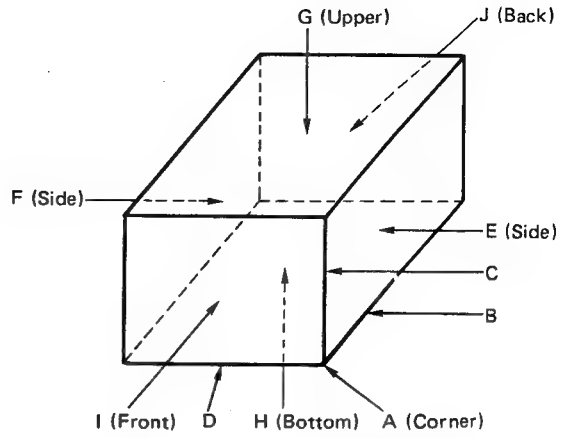
The color monitor must pass the following vibration test.
(Packed condition)

1) Frequency ...5 to 55 Hz
   (Sweep cycle 120 seconds)
2) Length of time for testing
   Vertical ..... 60 minutes
   Horizontal .. 60 minutes
   (Front and Rear : 30 minutes)
   (Right and Left : 30 minutes)
3) Acceleration of Vibration
   Vertical 1.25G
   Horizontal ...0.75G

10.2.2 Shock

The color monitor must pass the following drop shock test.
(Packed condition)

	Height	Times
A,B,C,D	50 cm	Totally 10 times
E,F,G,H,I,J	60 cm	



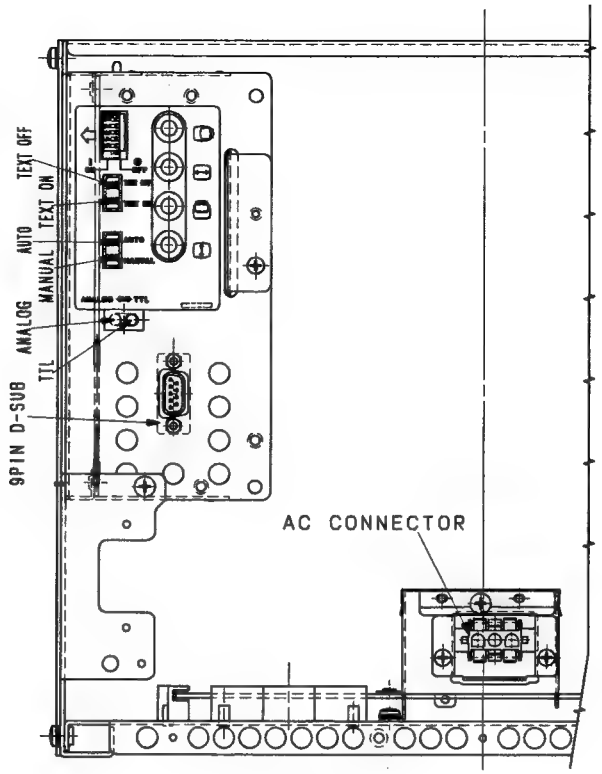
Shock is given to A, B, C, D, E, F, G, H, I and G totally 10 times.

10.3 SAFETY SPECIFICATION

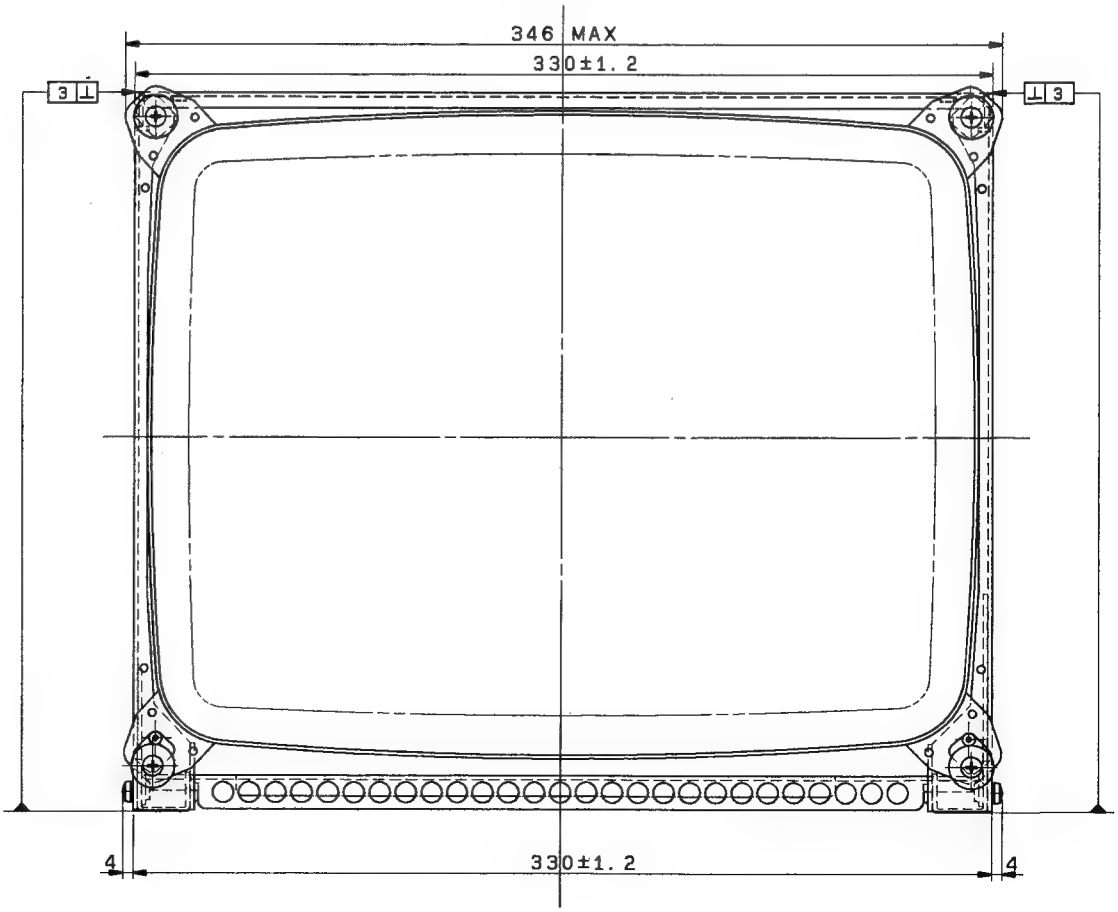
Shall be certified with
TÜV, BS415
VDE0871 (A)

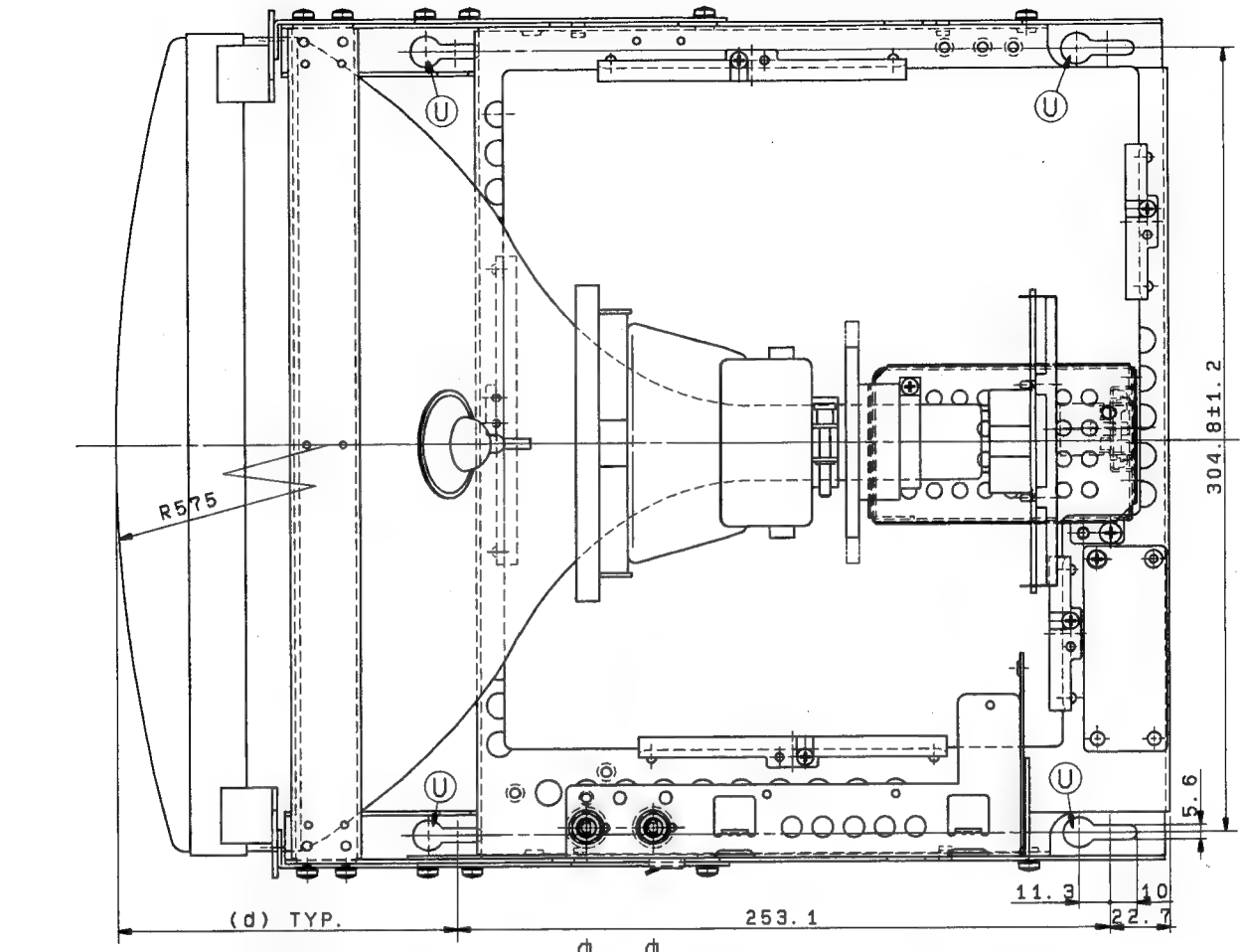
DIMENSIONS

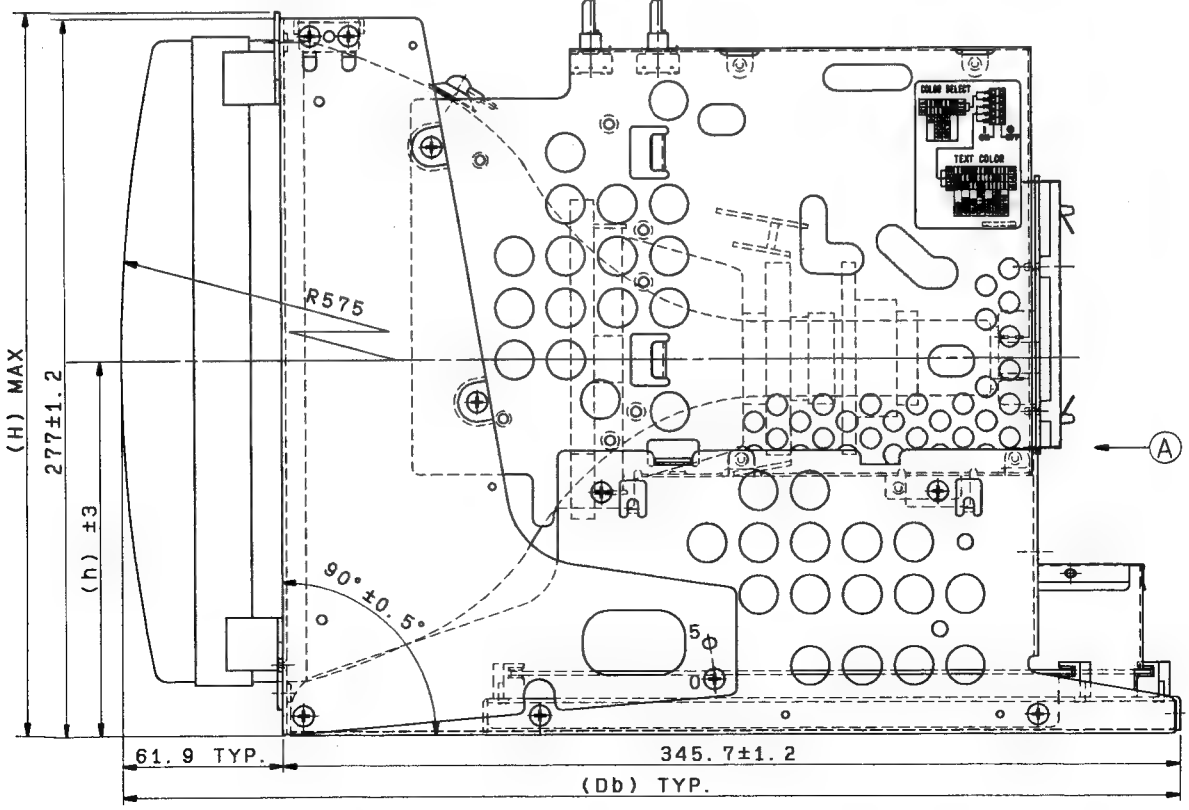
5°	283.6	150.4	119.6	395.3
0°	283.8	144.8	131.8	407.6
CRT TILT	(H) MAX	(h) ± 3	(d) TYP.	(Db) TYP.



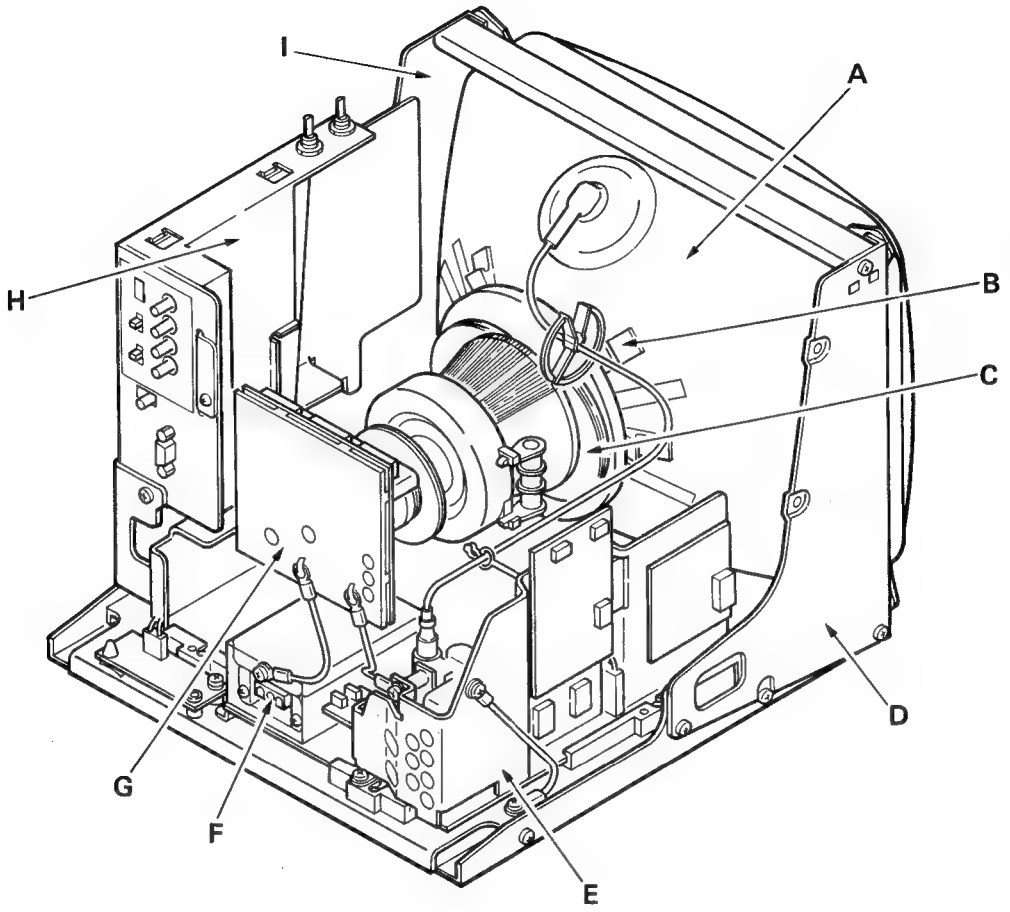
Ⓐ VIEW




R575
304.8±1.2
5.6
11.3
10
22.7
(d) TYP.
253.1


COLOR SELECT
TEXT COLOR
R575
(H) MAX
277±1.2
(h) ±3
90°±0.5°
5Φ
A
61.9 TYP.
345.7±1.2
(Db) TYP.

COMPONENT LOCATION



A ..... CRT
M34JDJ80X

B ..... WEDGE
TMM85511

C ..... DEFLECTION YOKE
TXALY85327B1

D ..... SIDE PLATE (L)
TUW87908

E ..... MAIN P.W.A
TNP890253-31

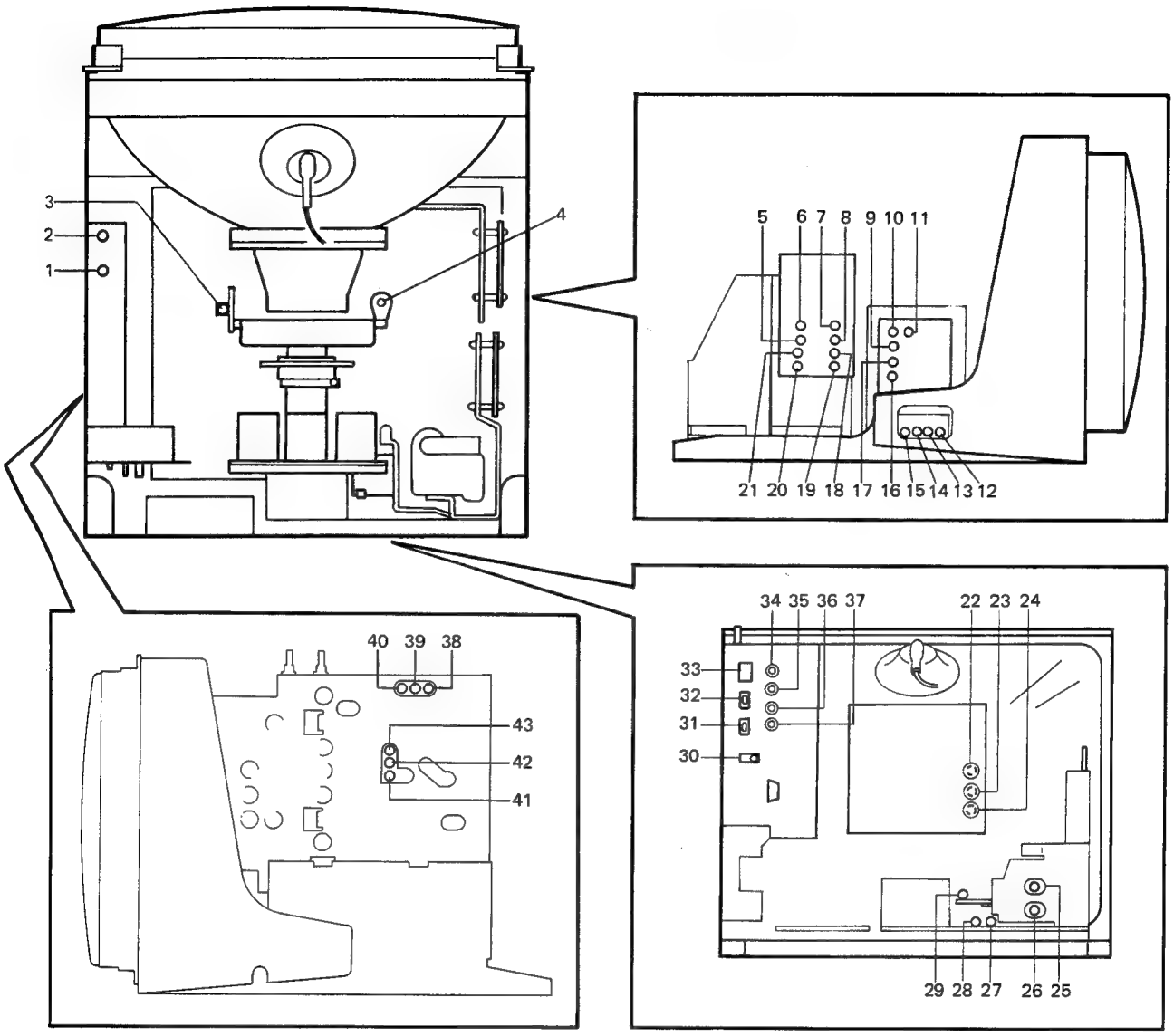
F ..... AC INPUT CONNECTOR
TXAJTA3P1427

G ..... CRT SOCKET BOARD
TNP800166-21

H ..... I/F P.W.A
TNP800167-31

I ..... SIDE PLATE (R)
TUW87909

CONTROL LOCATION



1 .... BRIGHTNESS (VR1301)
2 .... CONTRAST (VR1300)
3 .... DIFFERENTIAL RESISTOR
4 .... DIFFERENTIAL COIL
5 .... SUB H. POSITION (VR533)
6 .... SUB H. POSITION (VR532)
7 .... SUB H. WIDTH (VR553)
8 .... SUB H. WIDTH (VR554)
9 .... SUB V. HEIGHT (VR405)
10 .... SUB V. HEIGHT (VR404)
11 .... SUB V. HEIGHT (VR408)
12 .... H. HOLD (VR501)
13 .... H. FERREN (VR502)
14 .... V. PCC (VR751)
15 .... V. LIN (VR402)
16 .... SUB V. HEIGHT (VR407)
17 .... SUB V. HEIGHT (VR406)
18 .... SUB H. WIDTH (VR555)
19 .... SUB H. WIDTH (VR556)
20 .... SUB H. POSITION (VR535)
21 .... SUB H. POSITION (VR534)
22 .... LOW LIGHT (B) (VR3372)
23 .... LOW LIGHT (G) (VR3371)
24 .... LOW LIGHT (R) (VR3370)
25 .... FOCUS CONTROL
26 .... SCREEN CONTROL
27 .... H. CENT (VR551)
28 .... +B ADJ (VR841)
29 .... SUB BRIGHT (VR 361)
30 .... ANALOG/TTL SW (SW1301)
31 .... AUTO/MANUAL SW (SW1302)
32 .... TEXT ON/OFF SW (SW1304)
33 .... COLOR SELECT SW (SW1303)
34 .... H. POSITION (VR531)
35 .... H. WIDTH (VR552)
36 .... V. POSITION (VR431)
37 .... V. HEIGHT (VR403)
38 .... PED ADJ (VR1305)
39 .... R. GAIN (VR1301)
40 .... B. GAIN (VR1303)
41 .... SUB CONTRAST (VR1309)
42 .... 2/3 D-A (VR1311)
43 .... 1/3 D-A (VR1312)

DISASSEMBLY INSTRUCTIONS

Interface Block Removal

1. Remove the four screws that fasten the interface block to the side plate (right) and side plate mount.
2. Disconnect the CN102B connector from the interface board.
3. Straighten the clamper that fastens the ferrite core, and remove the ferrite core.
4. Remove three screws on the shield cover.
5. Disconnect the CN1301, CN1304, CN1305 and CN-1306 connectors from the interface board.
6. Disconnect the V301, V302, and V303 phone jack connectors from the interface board.
7. Remove the four screws that fasten the interface board to the chassis.
8. Raise the interface board as shown and remove it.

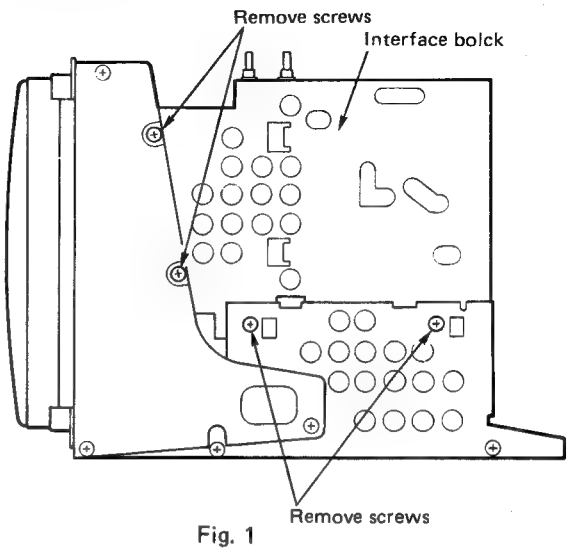


Fig. 1

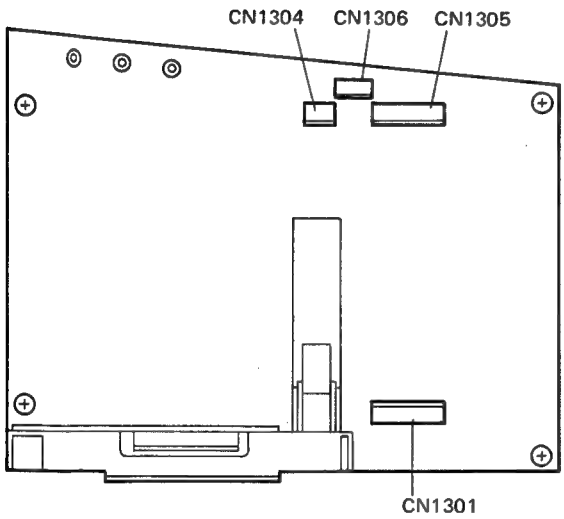


Fig. 3

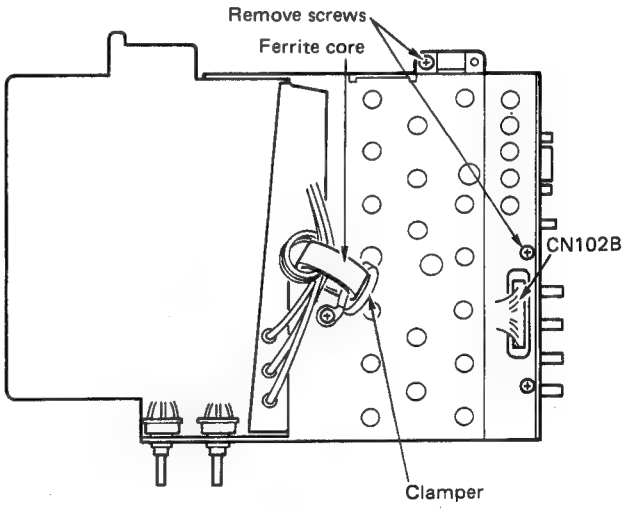


Fig. 2

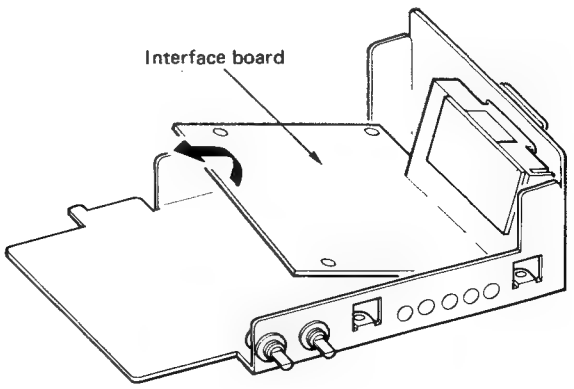


Fig. 4

CRT Socket Board Removal

1. Remove the ground wire terminal screw.
2. Garefully use a knife to slice the silicon adhesive away from the CRT socket.
   Then unplug the CRT socket board by gently rocking it from side to side while pulling it away from the CRT.
3. Disconnect the CN303 and CN304 cable connectors from the CRT socket board.
4. Disconnect the CN305, CN306 and CN307 phone-jack connectors from the CRT socket board.
5. Desolder the CRT socket board shield plate.
6. Desolder the G2 and E301 lead wires.
7. Open the CRT socket cover using a flat tip screw-driver.
8. Desolder the focus lead wires on the socket.

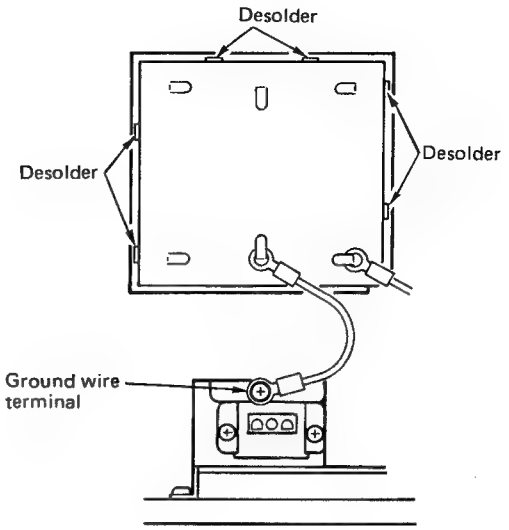


Fig. 5

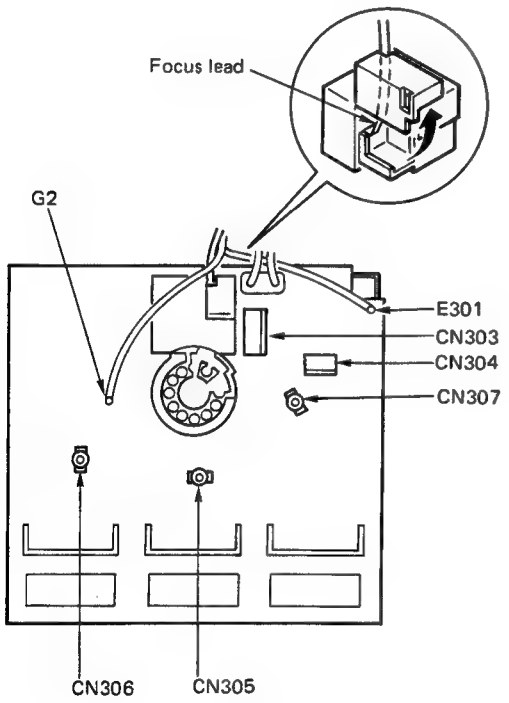


Fig. 7

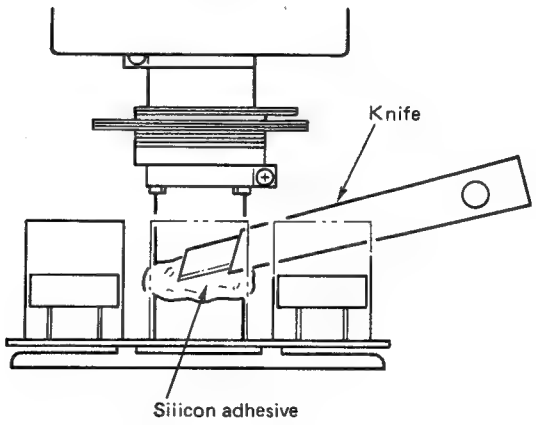


Fig. 6

Sub Board Removal

1. Disconnect the CN401B connectors from the Sub board (TNP890130Y).
2. Remove the screw that fastens the subboard.
3. Push a locking support with pliers as shown and raise the subboard.
4. Push the other locking support with pliers in the same way and remove the subboard.
5. Disconnect the CN502B and CN503B connectors from the subboard (TNP890130W).
6. Remove the screw that fastens the subboard.
7. Push a locking support with pliers as shown and raise the subboard.
8. Push the other locking support with pliers in the same way and remove the subboard.

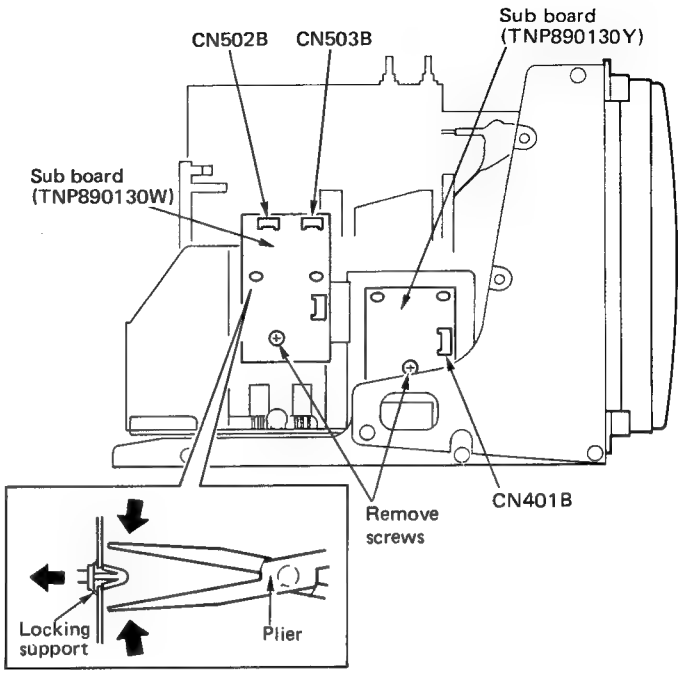


Fig. 8

Main Board Removal

1. Discharge the CRT anode to the ground, and disconnect the anode lead from the CRT.
2. Remove the ground wire terminal screw.
3. Remove the three screws that fasten the main board to the chassis.
4. Remove the screws that fasten the rail to the chassis, and remove the rail.
5. Slightly pull the main board rearward.
6. Disconnect the CN101, CN102A, CN301, CN302, CN303, CN304, CN305A, CN305B, CN306, CN401A, CN501A, CN502A, CN503A and CN851 connectors from the Main board.
7. Untwist the cable ties to free the cables.
8. Unwrap the cable restraints to free the cables.
9. Pull and remove the main board.

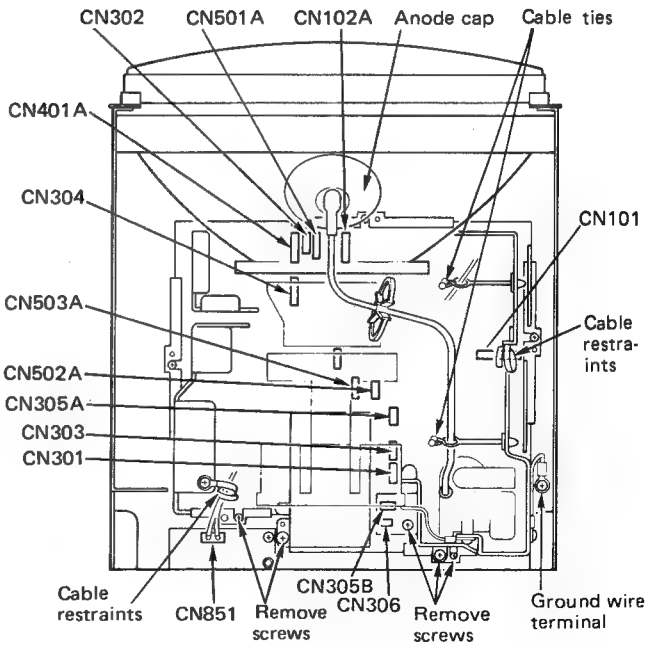


Fig. 9

CRT Removal

The deflection yoke and convergence yoke remains on the CRT during removal.

1. Place a soft pad on the bench top and then the display unit on it face down.
2. Remove the four screws shown at the corners of the diecast chassis.
3. Hold the CRT by the neck, and remove the CRT from the chassis.

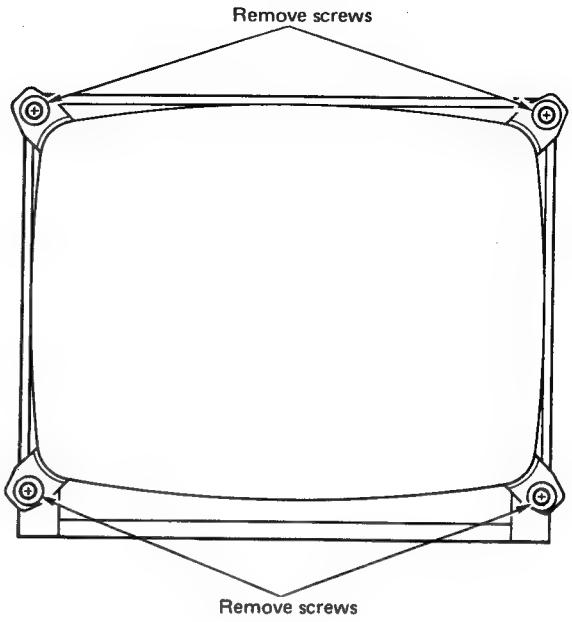


Fig. 10

CAUTION FOR ADJUSTMENT AND REPAIR

1. Degaussing is inevitably required at purity adjustment or convergence adjustment.
2. At the factory, white balance meter is used ,but we described the data in simple way.
3. If you check or adjust electrical specification or function, more than 20 minutes burn-in is required.
4. Reforming of the leadwire is required after your repair work.

CAUTION FOR SERVICING

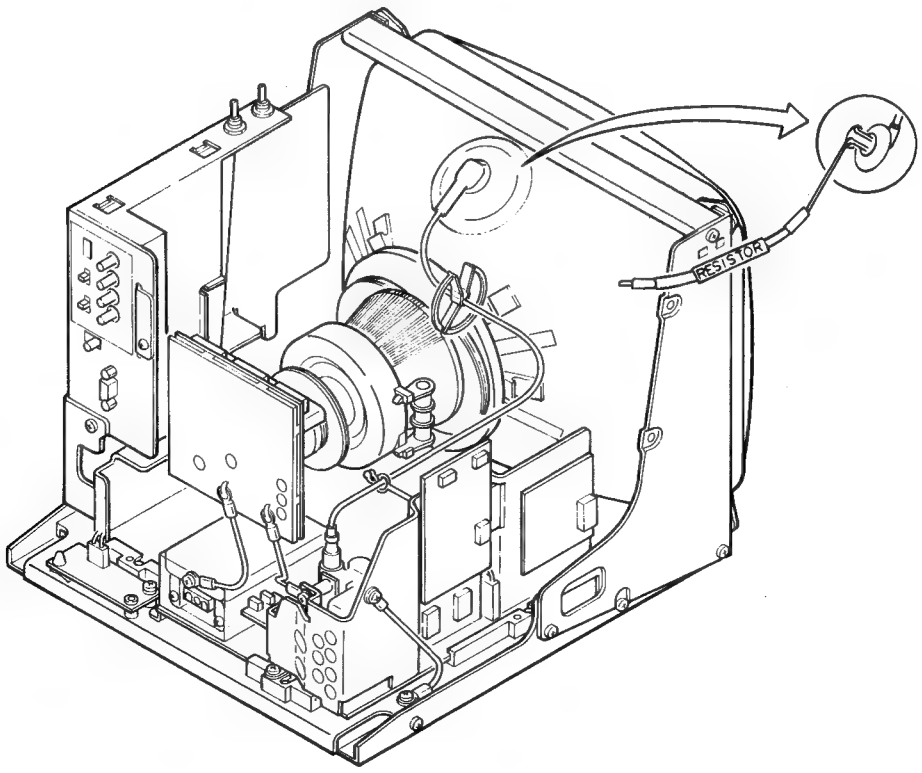
When servicing or replacing the CRT, high voltage sometimes remains on the anode. So, completely discharge high voltage before servicing or replacing the CRT so as to prevent a shock to the serviceman.

CRT Anode Discharge

1. When you check the CRT anode or replace the CRT, discharge the CRT anode to the external conductive coating (aquadag) of CRT, especially when checked right after power turn-off.
2. Ground one end of a jumper wire which has a resistor (30kV < resisting pressure 100MΩ) and connect the other point to the CRT anode.
   NOTE : Grounding must be done first.

This model has a section that does not share a common ground with the power supply section. The different sections are referred to as the HOT section and the COLD section in the precautions below.

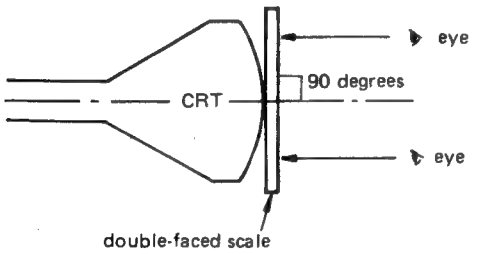
1. Do not touch the HOT section and the COLD section at the same time. You may receive an electric shock.
2. Do not short the HOT section to the COLD section. This could blow the fuse or damage parts..
3. Never measure the HOT section and the COLD section at the same time when using tools such as oscilloscopes or multimeters.
4. Always unplug the unit before beginning any operation such as removing the chassis.



ADJUSTMENT PROCEDURE

PRELIMINARY NOTES

- The adjustment procedures in this section require various screen patterns and displays.
- Use a Helmholtz device to adjust this unit with no horizontal magnetic field and a vertical magnetic field of 0.5 Gauss. Inspect the unit under the same conditions.
- The ambient illumination must be less than 10 lux.
- When checking the adjustments, demagnetize with a degaussing coil.
- To be sure image width, height, linearity and distortion proceed as below.



Measure level with respect to tube axis.

STANDARD CONDITION OF ADJUSTMENT PROCEDURE

- Signal timing: Standard timing
  MODE 2 signal (See page 25)
- Display pattern: Green (2/3 level) "H" character
- Signal level: TTL level
- Input source: AC 230V, 50 Hz
- Ambient temperature: Room temperature
- Warm up time: More than 20 minutes
- Brightness control: Point where back raster disappears
- Contrast control: Fully clockwise
- TTL/ANALOG select switch: TTL position
- AUTO/MANUAL select switch: AUTO position
- TEXT switch: OFF position
- Color select switch:

No.	1	2	3	4	5
	ON	ON	OFF	ON	OFF

- H. FREERUN control: Center click position
- +B ADJ: Fully turn clockwise
- H. WIDTH control: Center click position
- H. POSITION control: Center click position
- V. HEIGHT control: Center click position
- V. POSITION control: Set to center of screen with VR431 in Mode 2
- AFC switch: ON position
- Voltage select connector: Connect to AC 220V
- Magnetic field: Vertical 0.4 Gauss
  Horizontal 0
- Signal cable: 3C2V, ≦ 1.8m (≦ 70.87")

TOOLS REQUIRED

- Oscilloscope (dual trace)
- Scope probe — Attenuation : 100:1
  Attenuation : 10:1
- Digital Voltmeter — Range : 0 to 1000V DC, Accurancy : 0.1%
- High Voltage probe — Range : 0 to 24kV, Attenuation : 1000:1, Input Impedance : 1000MΩ
- TV color Analyzer II — that reads luminance and chromaticity X and Y coordinates. Calibrate with the Gamma C — 9DT.
- Digital High Voltmeter
- Frequency counter
- AC Power supply — Output voltage : 0 to 300V
- Degaussing coil
- Convergence meter
- Double-faced scale
- Screwdriver — Tip width : 1/10" (2.5mm) Length : 6" (15 cm)
- Screwdriver — Tip width : 1/10" (2.5mm) Length : 6" (15 cm), non-conductive
- Screwdriver — Tip width : 1/10" (2.5mm) Length : 12" (30 cm), non-conductive
- Screwdriver — Cross Recessed Head
- Adjustment tool — Hex head, non-conductive
- White lacquer

Signal Condition Data for Adjustment

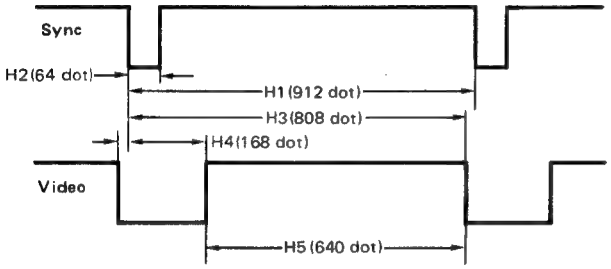
MODE 1 SIGNAL TIMING

Display area	H (640 dot) x V (200 H)
Character	H (6) x V (7) dot
Block	H (8) x V (8 dot)
Video signal	TTL
Sync signal	TTL separate
Horizontal frequency	15.7 kHz
Vertical frequency	60 Hz
Duty ratio	100%
Clock frequency	14.31821 MHz
Clock period	0.069841 μsec

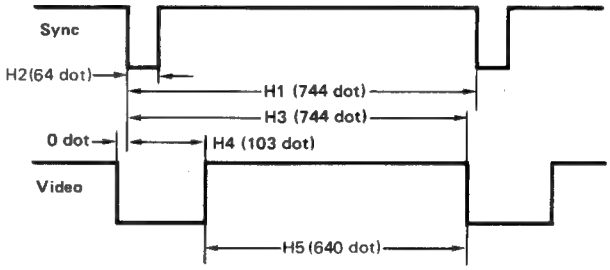
MODE 2 SIGNAL TIMING

Display area	H (640 dot) x V (350 H)
Character	H (7) x V (9) dot
Block	H (8) x V (14 dot)
Video signal	TTL
Sync signal	TTL separate
Horizontal frequency	21.85 kHz
Vertical frequency	60 Hz
Duty ratio	100%
Clock frequency	16.257 MHz
Clock period	0.0615119 μsec

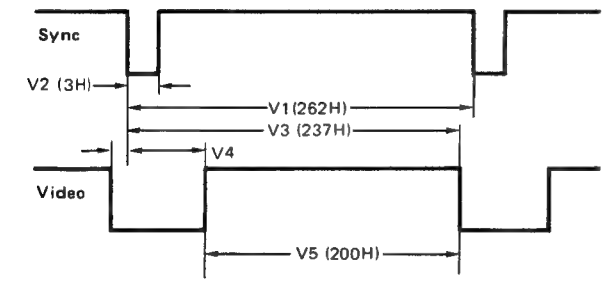
Horizontal



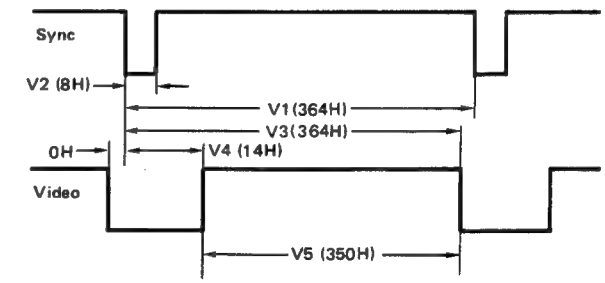
Horizontal



Vertical



Vertical



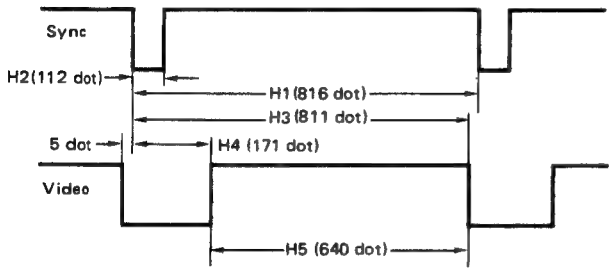
Horizontal Frequency		15.7 kHz
H. Sync	(H1)	63.66 μsec
HD pulse width	(H2)	4.47 μsec
H. BLK start	(H3)	56.4 μsec
H. BLK stop	(H4)	11.73 μsec
Video width	(H5)	44.67 μsec
Vertical Frequency		60 Hz
V. Sync	(V1)	16.67 msec
VD pulse width	(V2)	0.190 msec
V. BLK start	(V3)	15.08 msec
V. BLK stop	(V4)	2.350 msec
Video width	(V5)	12.70 msec

Horizontal Frequency		21.85 kHz
H. Sync	(H1)	45.76 μsec
HD pulse width	(H2)	3.94 μsec
H. BLK start	(H3)	45.7 μsec
H. BLK stop	(H4)	6.34 μsec
Video width	(H5)	39.4 μsec
Vertical Frequency		60 Hz
V. Sync	(V1)	16.67 msec
VD pulse width	(V2)	0.360 msec
V. BLK start	(V3)	16.67 msec
V. BLK stop	(V4)	0.064 msec
Video width	(V5)	16.02 msec

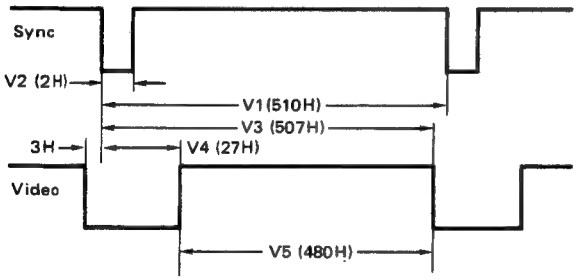
MODE 3 SIGNAL TIMING

Display area	H (640 dot) x V (480 H)
Character	H (7) x V (9) dot
Block	H (8) x V (12 dot)
Video signal	ANALOG
Sync signal	TTL composite
Horizontal frequency	30.63 kHz
Vertical frequency	60.06 Hz
Duty ratio	100%
Clock frequency	25.000 MHz
Clock period	0.04 μsec

Horizontal



Vertical

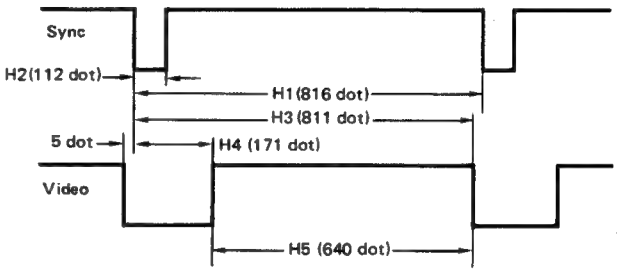


Horizontal Frequency		30.63 kHz
H. Sync	(H1)	32.647 μsec
HD pulse width	(H2)	4.48 μsec
H. BLK start	(H3)	32.447 μsec
H. BLK stop	(H4)	6.84 μsec
Video width	(H5)	25.607 μsec
Vertical Frequency		60.06 Hz
V. Sync	(V1)	16.65 msec
VD pulse width	(V2)	0.0653 msec
V. BLK start	(V3)	16.552 msec
V. BLK stop	(V4)	0.8810 msec
Video width	(V5)	15.670 msec

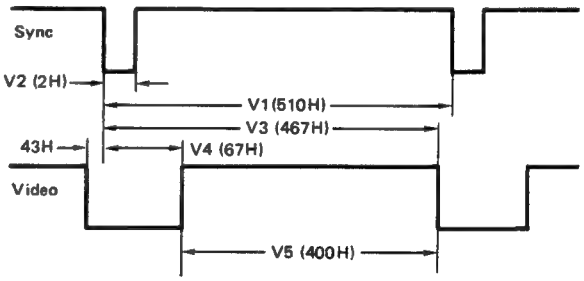
MODE 4 SIGNAL TIMING

Display area	H (640 dot) x V (400 H)
Character	H (7) x V (9) dot
Block	H (8) x V (12 dot)
Video signal	ANALOG
Sync signal	TTL composite
Horizontal frequency	30.63 kHz
Vertical frequency	60.06 Hz
Duty ratio	100%
Clock frequency	25.000 MHz
Clock period	0.04 μsec

Horizontal



Vertical

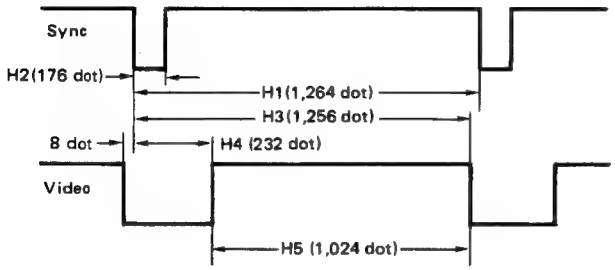


Horizontal Frequency		30.63 kHz
H. Sync	(H1)	32.647 μsec
HD pulse width	(H2)	4.48 μsec
H. BLK start	(H3)	32.447 μsec
H. BLK stop	(H4)	6.84 μsec
Video width	(H5)	25.607 μsec
Vertical Frequency		60.06 Hz
V. Sync	(V1)	16.650 msec
VD pulse width	(V2)	0.0653 msec
V. BLK start	(V3)	15.246 msec
V. BLK stop	(V4)	2.1870 msec
Video width	(V5)	13.058 msec

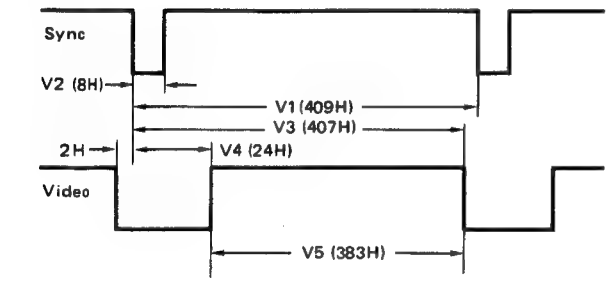
MODE 5 SIGNAL TIMING

Display area	H (1024 dot) x V (383 H)
Character	H (7) x V (9) dot
Block	H (18) x V (16 dot)
Video signal	ANALOG
Sync signal	TTL separate
Horizontal frequency	35.52 kHz
Vertical frequency	86.8 Hz
Duty ratio	100%
Clock frequency	44.8970 MHz
Clock period	0.0222732 μsec

Horizontal



Vertical



Horizontal Frequency		35.52 kHz
H. Sync	(H1)	28.153 μsec
HD pulse width	(H2)	3.920 μsec
H. BLK start	(H3)	27.975 μsec
H. BLK stop	(H4)	5.167 μsec
Video width	(H5)	22.808 μsec
Vertical Frequency		86.8 Hz
V. Sync	(V1)	11.515 msec
VD pulse width	(V2)	0.2250 msec
V. BLK start	(V3)	11.458 msec
V. BLK stop	(V4)	0.6750 msec
Video width	(V5)	10.783 msec

Table of Switch Settings in Individual Modes

Item \ Mode			1	2	3	4	5				
Analog/TTL switch			TTL	TTL	Analog	Analog	TTL				Analog
Manual/auto switch			Auto	Auto	Auto	Auto	Manual				Manual
DIP SW	Color select	1	—	—	—	—	OFF	ON	OFF	ON	—
		2	—	—	—	—	OFF	OFF	ON	ON	—
Display color (Numerals in parentheses are color table numbers)			16B (2)	64 (4)	∞	∞	8 (1)	16Y (1)	16B (2)	64 (4)	∞
TEXT SW			OFF	OFF	—	—	ON or OFF				—
DIP SW	Text color	3	—	—	—	—	One of 8 colors appears depending on switch combination with TEXT SW ON.				—
		4	—	—	—	—					—
		5	—	—	—	—					—
Signal input connector Pin connection		1	GND	GND	RED	RED	GND				RED
		2	—	2nd RED (Rb)	GREEN	GREEN	2nd RED (Rb)				GREEN
		3	RED (Ra)	1st RED (Ra)	BLUE	BLUE	1st RED (Ra)				BLUE
		4	GREEN (Ga)	1st GREEN (Ga)	H.V SYNC	H.V SYNC	1st GREEN (Ga)				H. SYNC
		5	BLUE (Ba)	1st GREEN (Ba)	MODE (H)	MODE (L)	1st BLUE (Ba)				V. SYNC
		6	INT. (Gb)	2nd GREEN (Gb)	GND	GND	2nd GREEN (Gb)				GND
		7	—	2nd BLUE (Bb)	GND	GND	2nd BLUE (Bb)				GND
		8	H. SYNC	H. SYNC	GND	GND	H. SYNC				GND
		9	V. SYNC	V. SYNC	GND	GND	V. SYNC				GND

Notes :

- " —" indicates that the switch is invalid.
- 16B means 16-color display, brown; 16Y, 16-color display, yellow.

Color Table

(1) 8 color

	8 Colors			Output Level			Color Level	Note	
No.	RA	GA	BA	R%	G%	B%		Cont.	Bright
1	0	0	0	0	0	0	Black	×	×
2	0	0	1	0	0	100	Blue	×	○
3	0	1	0	0	100	0	Green	×	○
4	0	1	1	0	100	100	Cyan	×	○
5	1	0	0	100	0	0	Red	×	○
6	1	0	1	100	0	100	Magenta	×	○
7	1	1	0	100	100	0	Yellow	×	○
8	1	1	1	100	100	100	White	×	○

Note : External control availability "O" means availability
"X" means unavailability

(2) 16 color (Brown) (Yellow)

	16 Colors				Output Level			Color Level		Note	
No.	GB(I)	RA	GA	BA	R%	G%	B%			Cont.	Bright
1	0	0	0	0	0	0	0	Black		×	×
2	0	0	0	1	0	0	66	Blue		×	○
3	0	0	1	0	0	66	0	Green		×	○
4	0	0	1	1	0	66	66	Cyan		×	○
5	0	1	0	0	66	0	0	Red		×	○
6	0	1	0	1	66	0	66	Magenta		×	○
7	0	1	1	0	66	66	0	Brown	Brown	○	○
								Yellow	Yellow	×	○
8	0	1	1	1	66	66	66	Light Gray		×	○
9	1	0	0	0	33	33	33	Dark Gray		○	○
10	1	0	0	1	33	33	100	Light Blue		○	○
11	1	0	1	0	33	100	33	Light Green		○	○
12	1	0	1	1	33	100	100	Light Cyan		○	○
13	1	1	0	0	100	33	33	Light Red		○	○
14	1	1	0	1	100	33	100	Light Magenta		○	○
15	1	1	1	0	100	100	33	Brown	Yellow	○	○
								Yellow	—		
16	1	1	1	1	100	100	100	White		○	○

Note : External control availability "O" means availability
"X" means unavailability

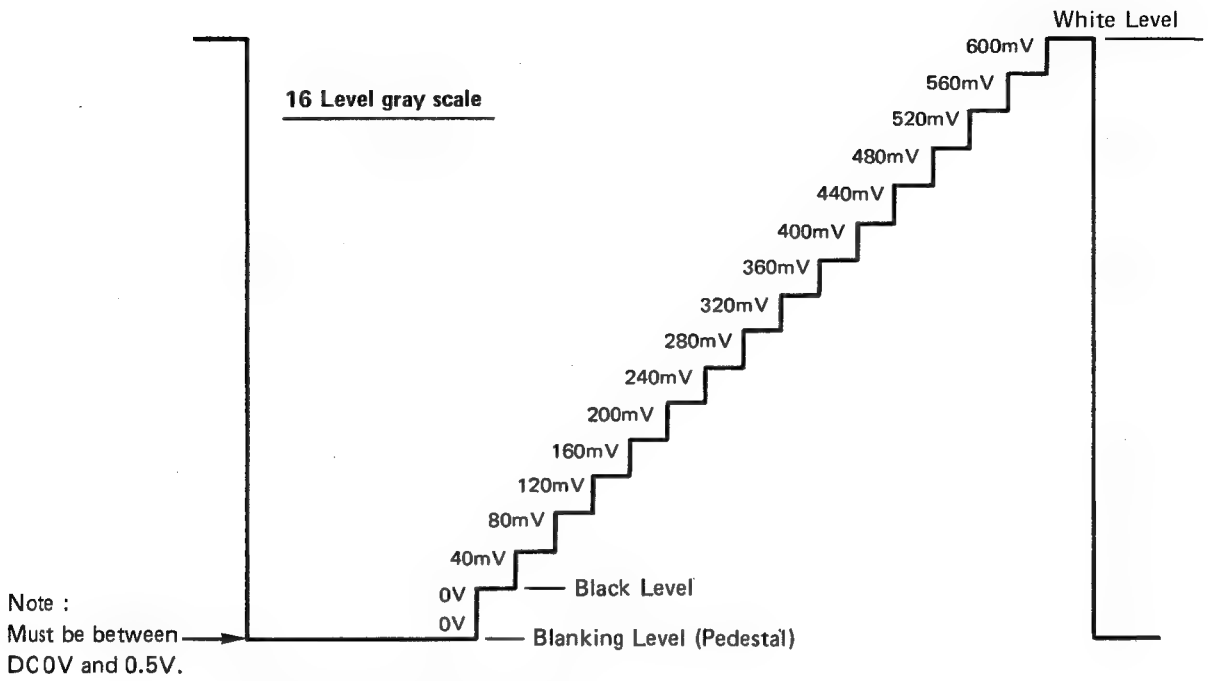
(3) 64 Color

No.	Input Video Signal						Relative Output Level			COLOR	Note 1	
	RB	GB	BB	RA	GA	BA	R%	G%	B%		Cont.	Bright
1	0	0	0	0	0	0	0	0	0	Black	x	x
2	0	0	0	0	0	1	0	0	66	L. L. Blue	x	o
3	0	0	0	0	1	0	0	66	0	L. L. Green	x	o
4	0	0	0	0	1	1	0	66	66	L. L. Cyan	x	o
5	0	0	0	1	0	0	66	0	0	L. L. Red	x	o
6	0	0	0	1	0	1	66	0	66	L. L. Magenta	x	o
7	0	0	0	1	1	0	66	66	0	L. L. Yellow	x	o
8	0	0	0	1	1	1	66	66	66	L. L. White	x	o
9	0	0	1	0	0	0	0	0	33	D. Blue	o	o
10	0	0	1	0	0	1	0	0	100	H. L. Blue	o	o
11	0	0	1	0	1	0	0	66	33		o	o
12	0	0	1	0	1	1	0	66	100		o	o
13	0	0	1	1	0	0	66	0	33		o	o
14	0	0	1	1	0	1	66	0	100		o	o
15	0	0	1	1	1	0	66	66	100		o	o
16	0	0	1	1	1	1	66	66	100		o	o
17	0	1	0	0	0	0	0	33	0	D. Green	o	o
18	0	1	0	0	0	1	0	33	66		o	o
19	0	1	0	0	1	0	0	100	0	H. L. Green	o	o
20	0	1	0	0	1	1	0	100	66		o	o
21	0	1	0	1	0	0	66	33	0		o	o
22	0	1	0	1	0	1	66	33	66		o	o
23	0	1	0	1	1	0	66	100	0		o	o
24	0	1	0	1	1	1	66	100	66		o	o
25	0	1	1	0	0	0	0	33	33	D. Cyan	o	o
26	0	1	1	0	0	1	0	33	100		o	o
27	0	1	1	0	1	0	0	100	33		o	o
28	0	1	1	0	1	1	0	100	100	H. L. Cyan	o	o
29	0	1	1	1	0	0	66	33	33		o	o
30	0	1	1	1	0	1	66	33	100		o	o
31	0	1	1	1	1	0	66	100	33		o	o
32	0	1	1	1	1	1	66	100	100		o	o
33	1	0	0	0	0	0	33	0	0	D. Red	o	o
34	1	0	0	0	0	1	33	0	66		o	o
35	1	0	0	0	1	0	33	66	0		o	o
36	1	0	0	0	1	1	33	66	66		o	o
37	1	0	0	1	0	0	100	0	0	H. L. Red	o	o
38	1	0	0	1	0	1	100	0	66		o	o
39	1	0	0	1	1	0	100	66	0		o	o
40	1	0	0	1	1	1	100	66	66		o	o
41	1	0	1	0	0	0	33	0	33	D. Magenta	o	o
42	1	0	1	0	0	1	33	0	100		o	o
43	1	0	1	0	1	0	33	66	33		o	o
44	1	0	1	0	1	1	33	66	100		o	o
45	1	0	1	1	0	0	100	0	33		o	o
46	1	0	1	1	0	1	100	0	100	H. L. Magenta	o	o
47	1	0	1	1	1	0	100	66	33		o	o
48	1	0	1	1	1	1	100	66	100		o	o
49	1	1	0	0	0	0	33	33	0	D. Yellow	o	o
50	1	1	0	0	0	1	33	33	66		o	o
51	1	1	0	0	1	0	33	100	0		o	o
52	1	1	0	0	1	1	33	100	66		o	o
53	1	1	0	1	0	0	100	33	0		o	o
54	1	1	0	1	0	1	100	33	66		o	o
55	1	1	0	1	1	0	100	100	0	H. L. Yellow	o	o
56	1	1	0	1	1	1	100	100	66		o	o
57	1	1	1	0	0	0	33	33	33	D. White	o	o
58	1	1	1	0	0	1	33	33	100		o	o
59	1	1	1	0	1	0	33	100	33		o	o
60	1	1	1	0	1	1	33	100	100		o	o
61	1	1	1	1	0	0	100	33	33		o	o
62	1	1	1	1	0	1	100	33	100		o	o
63	1	1	1	1	1	0	100	100	33		o	o
64	1	1	1	1	1	1	100	100	100	H. L. White	o	o

H. L. = High Light (Brighter)
L. L = Low Light
D = Dark

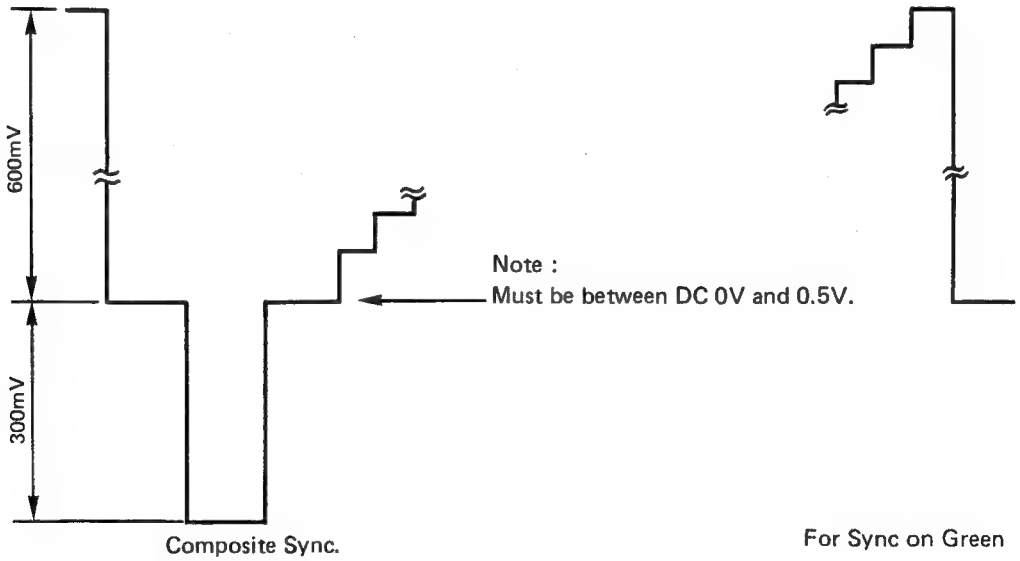
Analog Mode Signal Levels

The following levels apply to cases of 75-ohm termination.



VIDEO WAVEFORM LEVEL

For Color (Red, Blue and Green)



COMPOSITE VIDEO WAVEFORM LEVEL

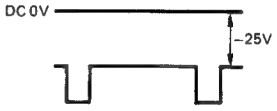
ADJUSTMENT ITEM

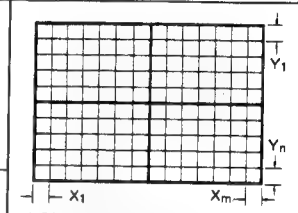
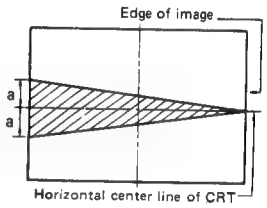
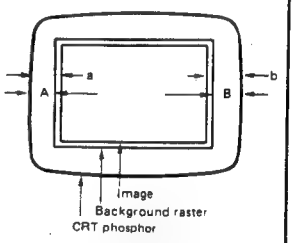
The adjustments for this Display Unit are;

1. **Horizontal adjustment**
2. **Voltage adjustment**
3. **Video pedestal adjustment**
4. **Focus adjustment**
5. **Purity adjustment**
6. **CRT cut off adjustment**
7. **Convergence adjustment**
8. **Voltage adjustment (DA output)**
9. **Side pincushion and V. lin adjustment**
10. **Horizontal position adjustment**
11. **Width and Height of Image adjustment**
12. **White balance adjustment**

These adjustments are listed as independent items; however, the success of these adjustment depends on performing them in the above sequence.

No.	ITEM	SIGNAL TIMING	ADJUST VR	ADJUSTMENT PROCEDURE	DESCRIPTION
1	Horizontal Adjustment	MODE M2	VR501 (H. HOLD)	1. Connect a frequency counter having a high-impedance probe to TP-51 and ground. 2. Turn off the SW501 (AFC). 3. Adjust VR501 (H. HOLD) to set the frequency to 21.85 kHz.	
		MODE M2	VR502 (H. FREERUN)	4. Turn off the H. SYNC signal and SW501 (AFC) on. 5. Adjust VR502 (H. FREERUN) to set the frequency to 15.5 kHz. *NOTE* ***After the adjustment, check that the frequency remains unchanged at 15.5 kHz when the input terminal is high or open.***	
		MODE M1		6. Turn on the H. SYNC signal and SW501 (AFC) off. 7. Check the frequency counter that it reads 16.3 kHz ±0.7 kHz.	
		MODE M5		8. Check the frequency counter that it reads 34.8 kHz $^{+1.7}_{-0.7}$ kHz.	
2	Voltage Adjustment	MODE M2	VR841 (+B ADJ)	1. Connect a digital voltmeter between the TP-81 on the Power board and ground. 2. Adjust VR841 (+B ADJ) to set the voltage to 64V. *NOTE* ***Because the voltage is subject to much variation with horizontal amplitude, a re-adjustment is necessary after horizontal amplitude adjustment.***	

No.	ITEM	SIGNAL TIMING	ADJUST VR	ADJUSTMENT PROCEDURE	DESCRIPTION
3	Video pedestal Adjustment	MODE M2	VR1305 (PED. ADJ)	1. Set the oscilloscope's time axis to the H rate, and connect the oscilloscope to TP-KB and ground. 2. Turn off video signal. 3. Adjust VR1305 (PED. ADJ) to set the voltage to 4V p-p.	
4	Focus Adjustment	MODE M2	FOCUS CONTROL (FBT)	1. Apply Ga = on, Gb = off video signal. 2. Adjust FOCUS control for best overall screen focus when viewing the displayed pattern. 3. After completion of adjustment, apply locking paint to the FOCUS control.	
5	Purity Adjustment			Refer to page 36.	
6	CRT Cut off Adjustment	MODE M2	LOW LIGHT CONTROL (VR3370, VR3371, VR3372) SCREEN CONTROL VR1301 (BRIGHT) VR361 (SUB BRIGHT)	1. Set the ambient illuminance at 10 lux. 2. Connect an oscilloscope to TP-G1 and ground. 3. Turn off video signal. 4. Adjust VR1301 (BRIGHT) and VR361 (SUB BRIGHT) to set the voltage –25V. 5. Turn LOW LIGHT controls (VR3370, VR3371, and VR3372) to the maximum position (in the direction in which the beam runs), then turn the SCREEN control until light goes on. Turn the LOW LIGHT controls that turned light on first and second to the minimum position. 6. Turn the SCREEN control until the last illuminating color is dimly on, and the LOW LIGHT controls for the other two colors until white balance is X = 0.281 and Y = 0.311. 7. Turn the SCREEN control until back-raster disappears. 8. Fully turn VR301 (BRIGHT) clockwise, and adjust brightness to 5^{+2}_{-1} cd/m² ($1.46^{+0.584}_{-0.292}$ ft-L) using VR361 (SUB BRIGHT).	
7	Convergence Adjustment	MODE M2		Refer to page 36.	
8	Voltage Adjustment (DA Output)	MODE M2	VR1311 (2/3 D-A) VR1312 (1/3 D-A)	1. Set the oscilloscope's time axis to the H rate, and connect the oscilloscope to TP-1302 and ground. 2. Apply Ga = on, Gb = off video signal. 3. Adjust VR1311 (2/3 D-A) to set the voltage to 0.36V p-p ①. 4. Apply Ga = off, Gb = on video signal. 5. Adjust VR1312 (1/3 D-A) to set the voltage to 0.36V p-p ②. 6. Apply Ga = on, Gb = on video signal.	

No.	ITEM	SIGNAL TIMING	ADJUST VR	ADJUSTMENT PROCEDURE	DESCRIPTION
8	Voltage Adjustment (DA Output)	MODE M2	VR1311 (2/3 D-A) VR1312 (1/3 D-A)	7. Check that the voltage is 0.6V p-p ± 6 mV ③. *NOTE* ***The voltages ① and ② must be the same, and the voltage ③ has priority. The voltages ① and ② are approximate.***	
9	Side Pincushion and V. lin Adjustment	MODE M2	VR402 (V. LIN) VR751 (V. PCC)	1. Apply a green crosshatch pattern signal. 2. Adjust VR751 (V. PCC) to achieve the optimum alignment of the grid pattern. 3. Adjust VR402 (V. LIN) until optimum linearity is obtained.	 HORIZONTAL LINEARITY $= \frac{X\,(MAX) - X\,(MIN)}{Y\,(MAX) + Y\,(MIN)} \times 100\% \leqq 7\%$ VERTICAL LINEARITY $= \frac{Y\,(MAX) - Y\,(MIN)}{Y\,(MAX) + Y\,(MIN)} \times 100\% \leqq 7\%$  a = 2mm (0.079")
		MODE M1		4. Check that linearity is ≦ 7% and that rotation is 2 mm (0.079").	
		MODE M5		5. Set SW1302 to MANUAL. 6. Check that linearity is ≦ 7% and that rotation is 2 mm (0.079").	
		MODE M2		7. Check that linearity is ≦ 7% and that rotation is 2 mm (0.079"). *NOTE* ***Only fc is variable. fH = 36.4 kHz, fV = 100 Hz***	
10	Horizontal Position Adjustment	MODE M5	VR551 (H. CENT)	1. Set SW1302 to MANUAL. 2. Turn off video signal. 3. Set VR1301 (BRIGHT) fully clockwise. 4. Turn VR551 (H. CENT) until displayed back raster horizontal position is A – B = 1 mm (0.039").	 A – B = 1 mm (0.039") a = b
		MODE M1	VR532 (SUB H. POSITION)	5. Turn VR532 (SUB H. POSITION) until display area horizontal position is a = b.	
		MODE M2	VR533 (SUB H. POSITION)	6. Turn VR533 (SUB H. POSITION) until display area horizontal position is a = b.	
		MODE M3	VR534 (SUB H. POSITION)	7. Set SW1301 to ANALOG. 8. Select high mode. 9. Turn VR534 (SUB H. POSITION) until display area horizontal position is a = b.	
		MODE M5	VR535 (SUB H. POSITION)	10. Turn VR535 (SUB H. POSITION) until display area horizontal position is a = b.	
		MODE M5	VR531 (H. POSITION)	11. Turn VR531 (H. POSITION) and check that horizontal position is variable laterally by 15 mm (0.59") or more.	
11	Width and Height of Image Adjustment	MODE M1	VR533 (SUB H. WIDTH)	1. Adjust VR553 (SUB H. WIDTH) to set the width of the image at 250 mm (9.84"). 2. Adjust VR404 (SUB V. HEIGHT) to set the height of the image at 187.5 mm (7.38").	

No.	ITEM	SIGNAL TIMING	ADJUST VR	ADJUSTMENT PROCEDURE	DESCRIPTION
11	Width and Height of Image Adjustment	MODE M2		3. Adjust VR554 (SUB H. WIDTH) to set the width of the image at 250 mm (9.84"). 4. Adjust VR405 (SUB V. HEIGHT) to set the height of the image at 187.5 mm (7.38").	
		MODE M4		5. Set SW1301 to ANALOG and select low mode. 6. Adjust VR555 (SUB H. WIDTH) to set the width of the image at 250 mm (9.84"). 7. Adjust VR406 (SUB V. HEIGHT) to set the height of the image at 187.5 mm (7.38").	
		MODE M3		8. Select high mode. 9. Adjust VR408 (SUB V. HEIGHT) to set the height of the image at 187.5 mm (7.38").	
		MODE M5		10. Set SW1301 to MANUAL. 11. Adjust VR556 (SUB H. WIDTH) to set the width of the image at 250 mm (9.84"). 12. Adjust VR407 (SUB V. HEIGHT) to set the height of the image at 187.5 mm (7.38"). 13. Turn VR552 (H. WIDTH) and VR403 (V. HEIGHT) and check that width and height are variable vertically by 20 mm (0.79") or more.	
12	White Balance Adjustment	MODE M2		1. Turn video channel A off and channel B on. 2. Apply a 10% window signal. 3. Set VR1300 (CONTRAST) fully clockwise. 4. Turn VR1301 (BRIGHT) until back raster goes out. 5. Visually adjust picture to white using the red and blue GAIN controls (VR1301 and VR1303). CIE chromaticity coordinate must be at X = 0.281 and Y = 0.311 after ADJUSTMENT. 6. Adjust luminance to 110 cd/m^2 (32.12 ft-L) with VR1309 (SUB CONT). 7. Turn both video channels A and B on. 8. Check luminance for full white field signal that it is 110 (32.12 ft-L) ± 25 cd/m^2 (7.3 ft-L). 9. Check that luminance is 100 (29.2 ft-L) ± 25 cd/m^2 (7.3 ft-L) when video channel A is on and channel B off, and when video channel A is off and channel B on. *NOTE* ***Check color tracking using VR1300 (CONTRAST). If not normal, readjust the LOW LIGHT controls (VR3370, VR3371, and VR-3372).***	

Purity adjustment

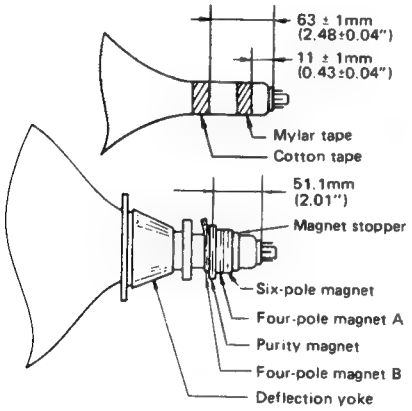
If color shading is apparent, make the following adjustment.

(1) Degauss the magnetism of chassis and CRT with external degaussing coil.

(2) Adjust the purity magnet until each of the red, green and blue channels is free of color shading.

Make the following adjustment if color shading cannot be corrected by the above, or if the CRT or deflection yoke has been replaced.

(1) Keep the convergence yoke and deflection yoke in the positions shown below.



CY tightening torque : $8 \pm^{2}_{1}$ kgf · cm
DY tightening torque : 22 ± 2 kgf · cm

(1) Make sure that this adjustment is done later than 30 minutes after power on.

(2) Degauss the magnetism of chassis and CRT with degaussing coil.

(3) Verify that static convergence is roughly matched. If it is misaligned, adjust static convergence of Red color and Blue color with Four-pole magnet B.
For this adjustment two same type of flaps of Four-pole magnet A must be put together.

(4) Remove the wedge from the deflection yoke, and pull the deflection yoke fully to the front.

(5) Display green color solely with the signal generator. Adjust the purity magnet so that the center of the screen displays a pure green disk.

(6) After the adjustment of step 5, readjust the static convergence if some gap was found. Static convergence alignment for this step is to be performed with Four-pole magnet B and Six-pole magnet.

(7) After the item 7, repeat the step 6 again.

(8) Display red and blue disks. Adjust the purity magnets so as that each disk is at the center of the screen simultaneously.

(9) Slide the deflection yoke rearward until the screen appars green on the whole, and fasten it there. (Fasten in a forward position with ample allowance for landing).

(10) Confirm purity in each direction by rotating the set to direction of East, West, South and North after degauss by external degaussing coil.

(11) If magnetism remains even after the adjustment, use the compensation magnet to obtain purity.

The final confirmation method for purity

In the natural magnetic field, rotate the monitor in the direction of East, West, South and North.
Earth's magnetic field may cause magnetism on the monitor. Confirm that the automatic degaussing circuit built in the monitor can erase the amount of magnetism which was introduced with above rotation.
The degaussing circuit operates only when the set is cold, you must wait for the set to cool after each purity test.

Convergence adjustment

(1) Make sure that this adjustment is done later than 30 minutes after power on.

(2) Degauss the magnetism of chassis and CRT with degaussing coil.

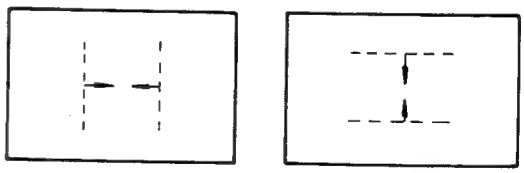
(3) Apply signal of red "H" character of full screen size from the signal generator.

(4) Bring the vertical center line to focus using the focus control.

(5) Loosen magnet stoppers by turning them counterclockwise while looking them from the back of CRT.

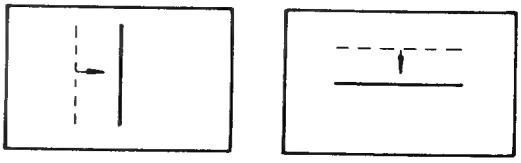
(6) Apply mixed crosshatch signals of red and blue from signal generator.

(7) Align convergence of vertical lines and horizontal lines at the center portion of the screen.
(When 4 pole magnet B is moved red and blue move in the reversed directions each other while making circles).

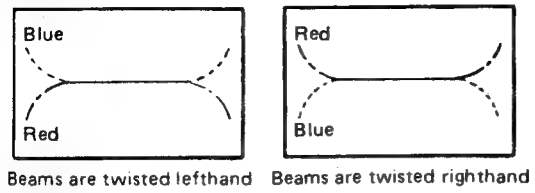


(8) Apply mixed crosshatch signal consists of red, blue and green from signal generator.

(9) Align convergence of magenta and green vertical lines and horizontal lines observed at around center portion of the screen with 6 pole magnet.

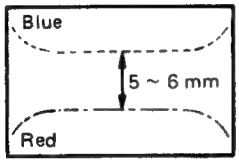


(10) If any of following misconvergence is observed on the screen it must be adjusted. (This step may be skipped if no misconvergence is observed.)

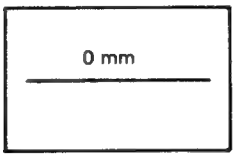


(a) When beams are twisted lefthand.

(b) Shift convergence of horizontal lines by 5 ~ 6 mm at the center portion with 4 pole magnet A. (Do not shift convergence of vertical lines.)



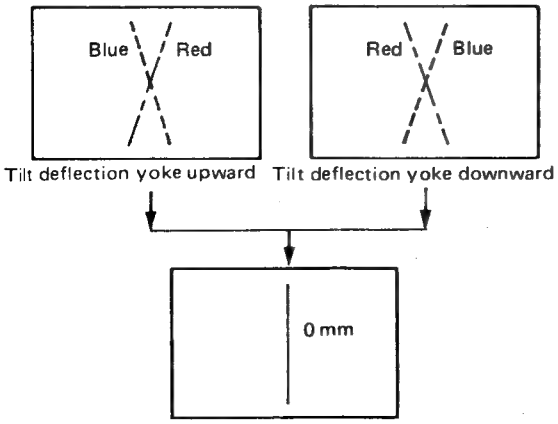
(c) Align convergence with 4 pole magnet B.

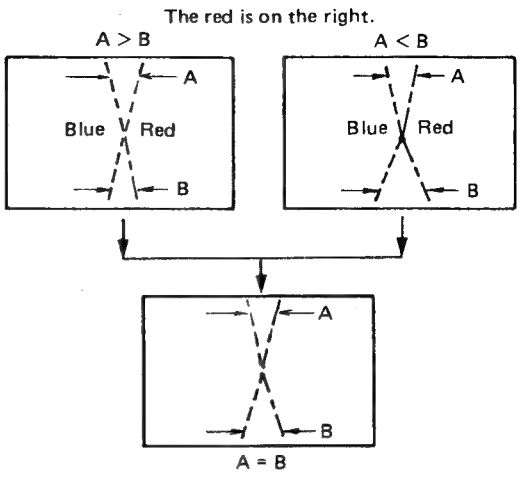


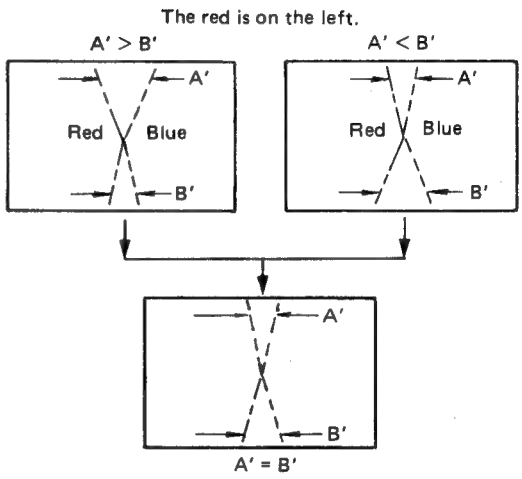
(d) Follow the same procedure when beams are twisted righthand. (Shift Red line upward and Blue line downward for adjustment.)

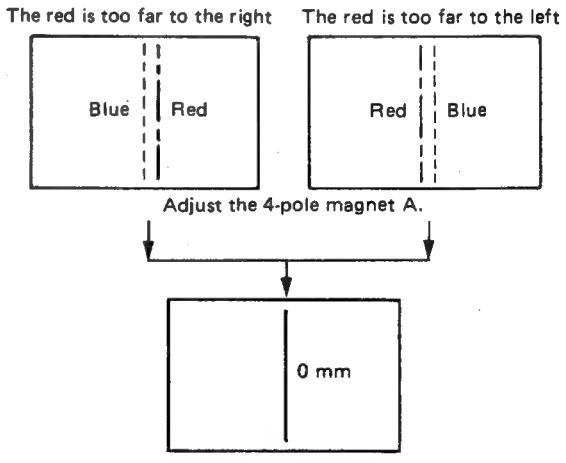
(11) Tighten magnet stoppers.

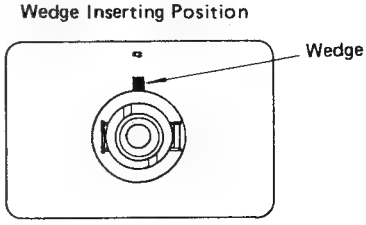
(12) Tilt the deflection yoke upward or downward to adjust the vertical line in the center of the screen. If convergence error is not reduced to 0 mm, refer to the figure below and tilt the deflection yoke till the convergence errors at the top and bottom are the same. After this adjustment, temporarily insert a wedge above the deflection yoke so that the convergence will not deviate due to an unsteady deflection yoke.



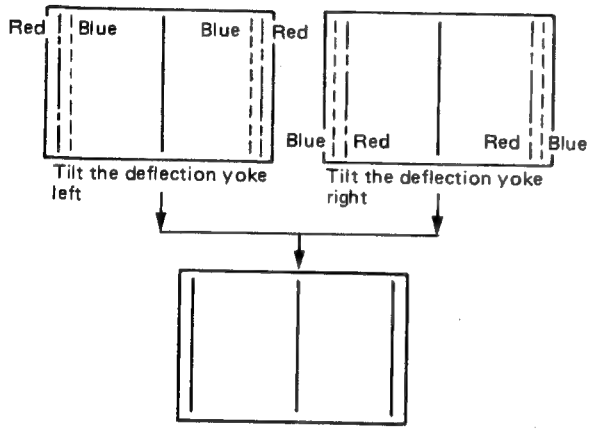


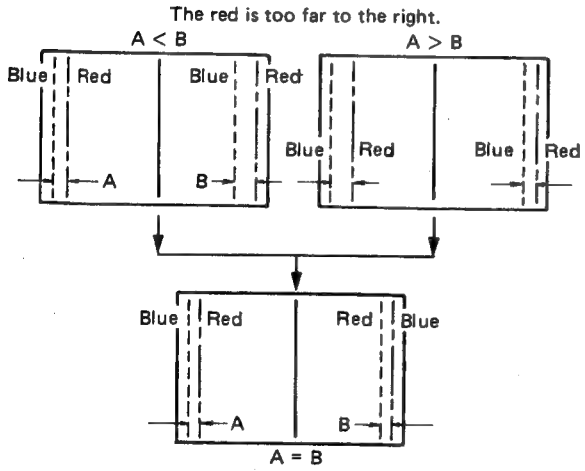


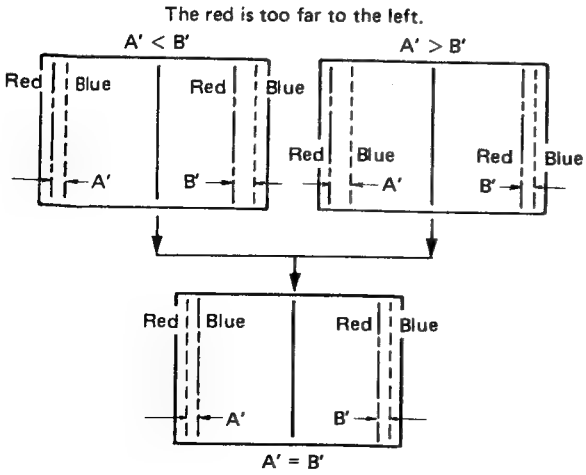


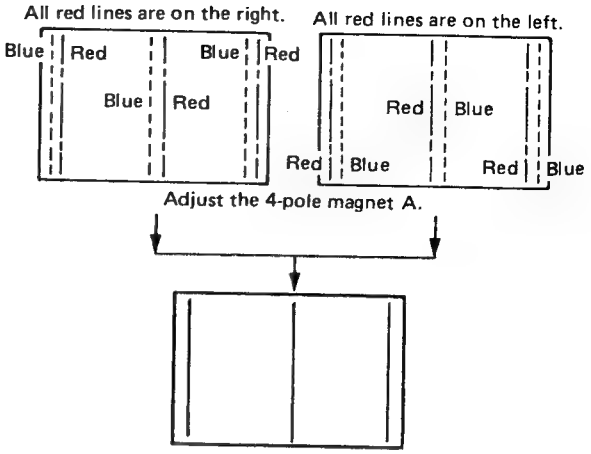


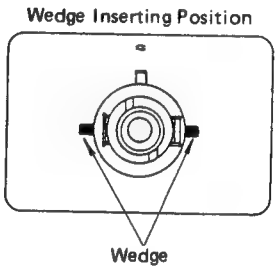
(13) Referring to the figures below, tilt the deflection yoke to the right or left to correct the vertical lines at the right and left ends of the screen. If convergence error is not reduced to 0 mm, refer to the figures below, and tilt the deflection yoke till the convergence errors at the right and left are the same. After this adjustment, insert wedges on the right and left of the deflection yoke so that the convergence will not deviate due to an unsteady deflection yoke. (Do not apply silicon rubber to the wedges to prevent them from slipping out.)





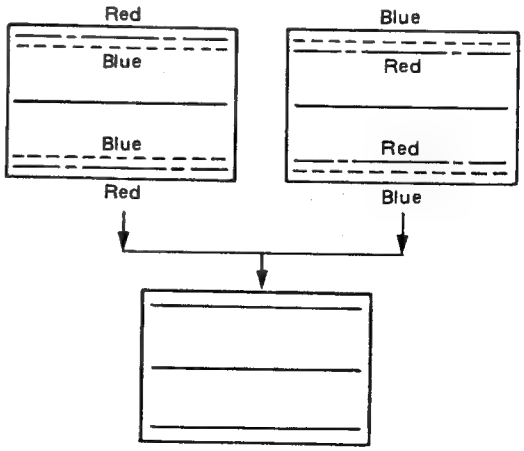


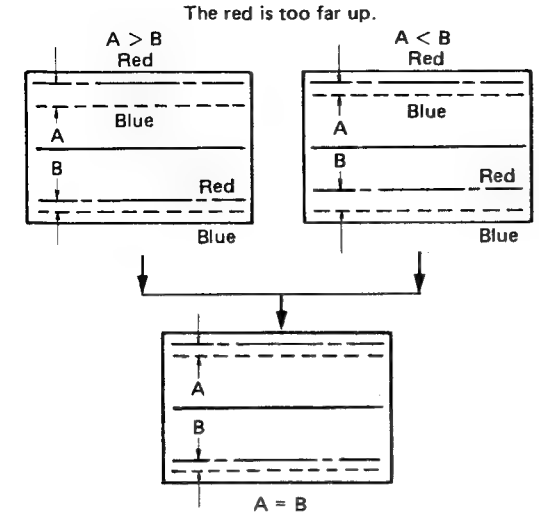


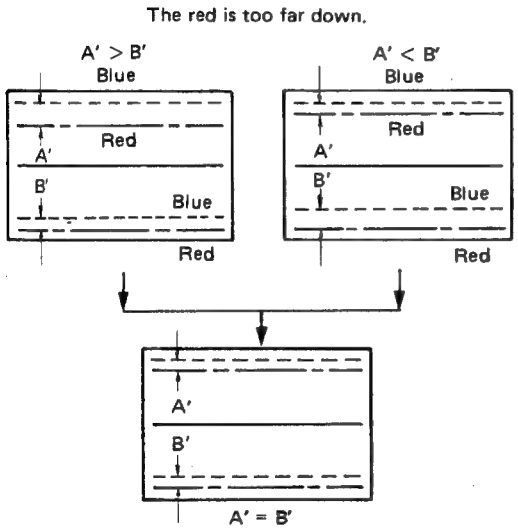


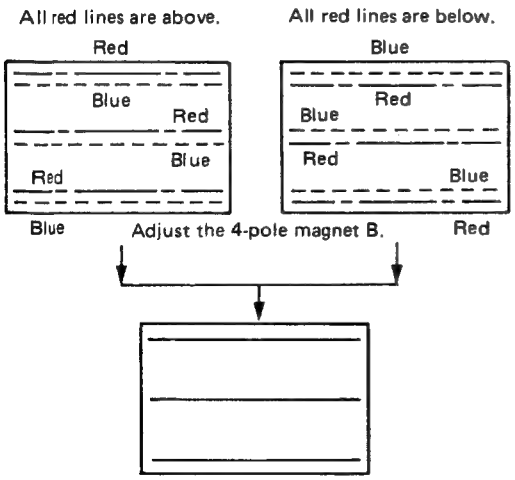
(14) After checking that the purity has not deviated, tighten the deflection yoke securely, exercising care not to cause convergence deviation.
Tightening torque : 22 ±2 kgf·cm
(2.16 ±0.2 N·m)

(15) Correct the upper and lower horizontal lines on the screen with the differential resistor. If convergence errors are not reduced to 0 mm, refer to the figures below, and adjust the differential resistor until the upper and lower convergence errors are the same.

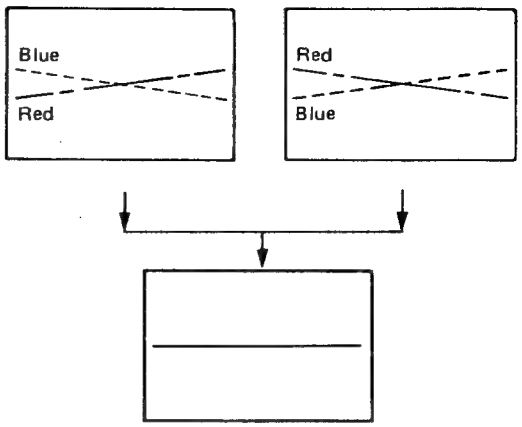


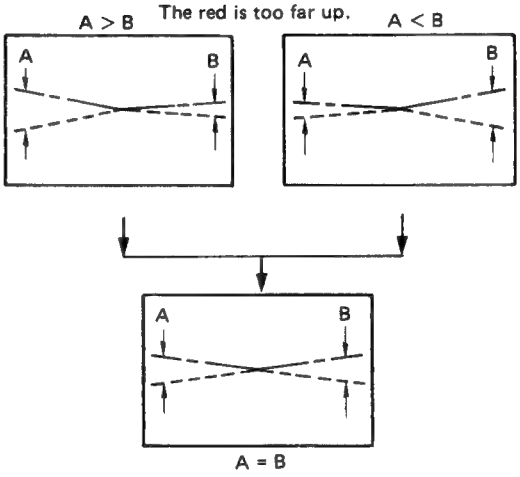


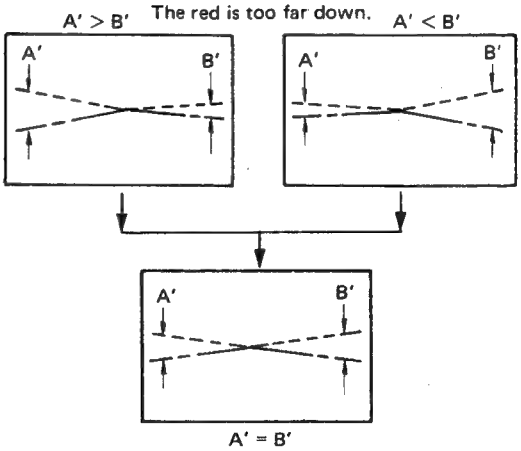


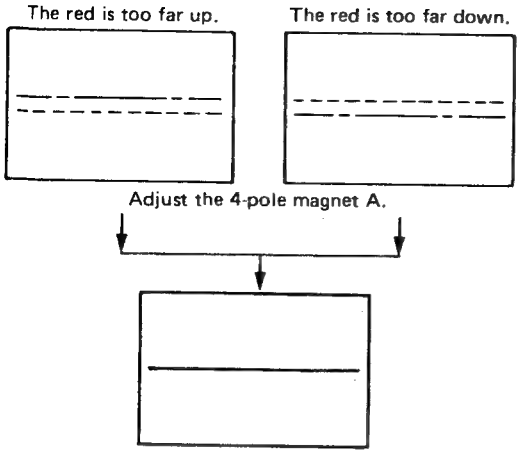


(16) Adjust the center horizontal line on the screen using the differential coil. If convergence errors are not reduced to 0 mm, refer to the figure below, and adjust the differential coil until the right and left convergence errors are the same.



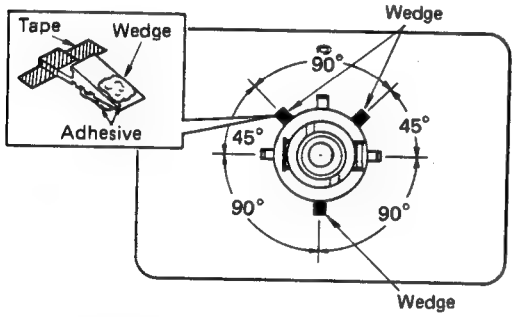




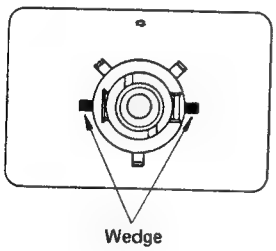


(17) Repeat adjustment the deflection yoke, differential resistor, and differential coil until the specified 0.35 mm is satisfied. The center convergence may deviate during their repeated adjustment. In that case, adjust the 4-pole magnet A and 6-pole magnet.

(18) Fasten the wedges to the bottom, upper left, and upper right of the deflection yoke with silicon adhesive and glass cloth tape as shown below.



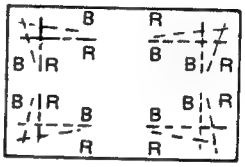
(19) Then, fasten the right and left wedges with silicon adhesive and glass cloth tape similarly, and remove the top wedge.



(20) After the adjustments mentioned in Items (7) through (17) have been properly made, correct the convergence errors at the four corners with permalloy until the specifications are satisfied.

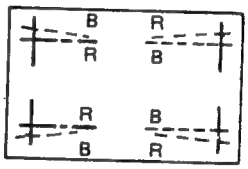
The red is too far to the right in the upper and lower right corners.

The blue is too far to the left in the upper and lower left corners.



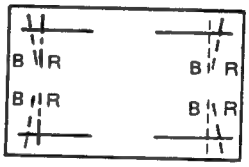
The horizontal red lines are too far up and down in the upper and lower right corners.

The horizontal blue lines are too far up and down in the upper and lower left corners.



The vertical red lines are too far to the right in the upper and lower right corners.

The vertical blue lines are too far to the lrft in the upper and lower left corners.



NOTE

A permalloy must be affixed apart from the anode cap over 20mm (0.79").
Do not pike up permalloys.
Do not affix a permalloy on the label.
Do not affix a permalloy above or below the wedges.
Fix permalloys with polyester tape.

(21) After completion of adjustment, apply locking paint to the movable portions of the deflection yoke and convergence yoke to secure them.

CHECK PROCEDURE

The checks for this Display Unit are;

1. **Vertical position check**
2. **Multicolor check**
3. **Gradation level check**
4. **Multicolor check (Text check)**
5. **White balance check**
6. **Overall performance check (Sync on green check)**
7. **Overall performance check (Sync combination check)**
8. **Overall performance check (TTL/ANALOG switch operation check)**

These are independent check items, but must be made in the specified sequence to be effective.
Be sure to make these checks after adjustments or repairs.

No.	ITEM	SIGNAL TIMING	CHECK PROCEDURE	DESCRIPTION
1	Vertical Position Check	MODE M5	1. Set SW1302 to MANUAL. 2. Turn VR431 (V. POSITION) and check that vertical position is variable laterally by 5 mm (0.2") or more.	
2	Multicolor Check	MODE M1	1. Apply a 64- color bar signal input. 2. Turn VR1300 (CONTRAST) from MIN to MAX and check that color changes from brown to red to brown to yellow.	See color table 2.
		MODE M2	3. Turn VR1300 (CONTRAST) from MIN to MAX. 4. Check that 1/3 level changes from 0 to 2/3.	See color table 4.
		MODE M5	5. Set SW1302 to MANUAL, and set SW1303 ① and ② to OFF. 6. Turn VR1300 (CONTRAST) from MIN to MAX, and check that level changes from 2/3 to 3/3. 7. Set SW1303 ① to ON, and SW1303 ② to OFF. 8. Turn VR1300 (CONTRAST) from MIN to MAX, and check that 2/3 level remains unchanged. 9. Set SW1303 ① to OFF and SW1303 ② to ON. 10. Turn VR1300 (CONTRAST) from MIN to MAX, and check that color changes from brown to red to brown to yellow. 11. Set SW1303 ① and ② to ON. 12. Turn VR1300 (CONTRAST) from MIN to MAX, and check that 1/3 level changes from 0 to 2/3. ***NOTE*** ***Check displayed colors according to the color tables of all signal condition data.***	See color table 1. See color table 3. See color table 2.
3	Gradation Level Check	MODE M5	1. Set the ambient illuminance at 10 lux. 2. Turn VR1301 (BRIGHT) until back raster goes out. 3. Set SW1301 to ANALOG and SW1302 to MANUAL. 4. Apply a video gradation pattern, mode 5 signal. 5. Turn VR1300 (CONTRAST) to MAX, and check that 16 gradations can be identified. ***NOTE*** ***If 16 gradations cannot be identified, repeat CRT cutoff adjustment.***	

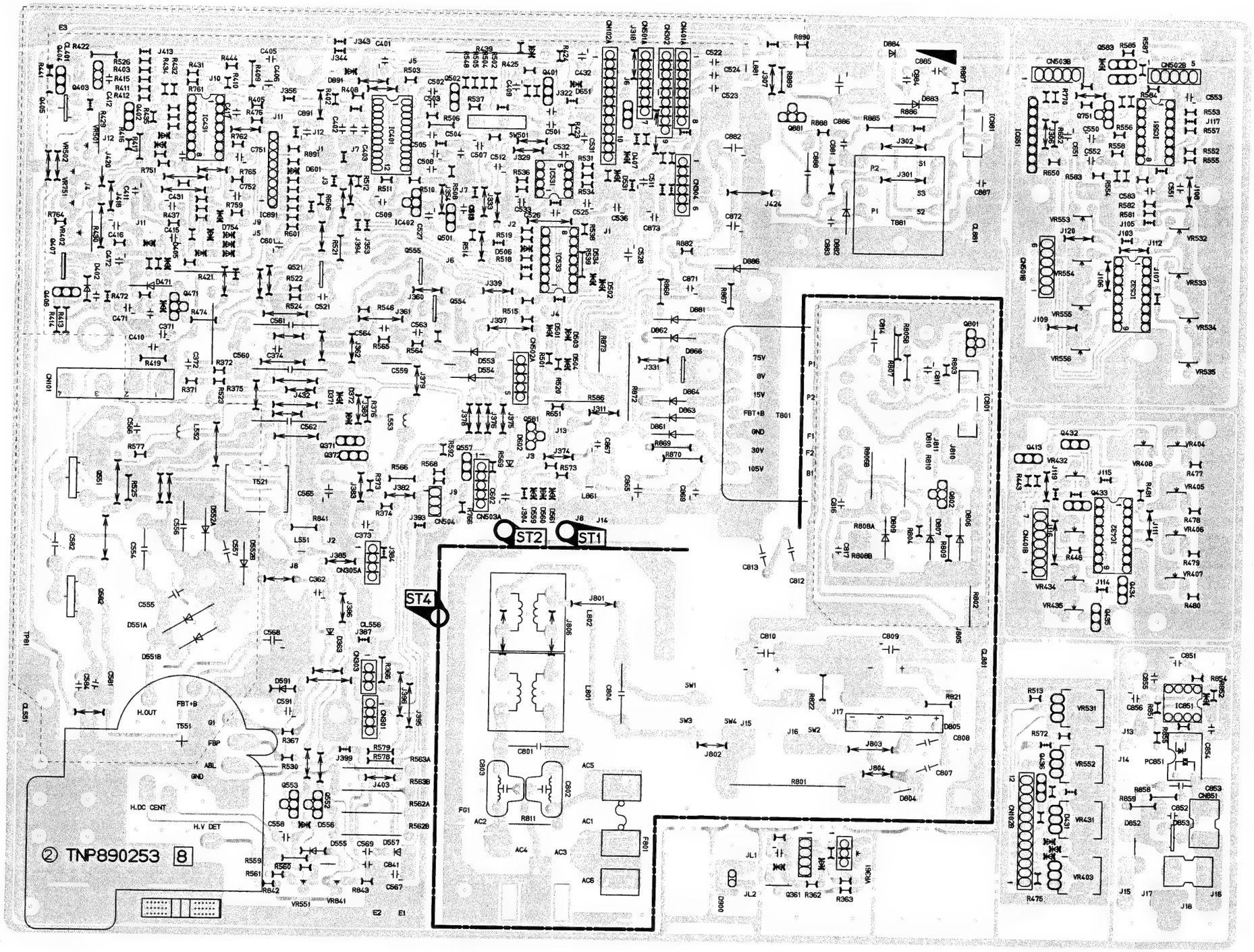
<table>
<tr><th>No.</th><th>ITEM</th><th>SIGNAL TIMING</th><th>CHECK PROCEDURE</th><th>DESCRIPTION</th></tr>
<tr><td>3</td><td>Gradation Level Check</td><td>MODE M5</td><td>6. Turn VR1300 (CONTRAST) from MIN to MAX, and check that tracking is satisfactory from white to black.

NOTE
If tones (particularly, grey) are different, readjust white balance.</td><td></td></tr>
<tr><td>4</td><td>White Balance Check</td><td>MODE M2</td><td>1. Set SW1301 to ANALOG.
2. Apply a full white field signal.
3. Adjust VR552 (H. WIDTH) to set the width of the image at 250 mm (9.84").
4. Adjust VR406 (SUB V. HEIGHT) to set the height of the image at 187.5 mm (7.38").
5. Set brightness to 110 cd/m² (32.12 ft-L) with VR1300 (CONTRAST).
6. Check to be sure that chromaticity coordinates are X = 0.281, Y = 0.311.</td><td></td></tr>
<tr><td>5</td><td>Multicolor Check (Text Check)</td><td>MODE M2</td><td>1. Apply a 64-color bar signal input.
2. Set SW1304 to ON.
3. Set SW1303 3(3), (4), and (5) as shown below, turn VR-1300 (CONTRAST) from MIN to MAX, and check as shown in the table below.
<table>
<tr><th>3</th><th>4</th><th>5</th><th>Check object</th></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>64-color bar</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>Red solid</td></tr>
<tr><td>OFF</td><td>ON</td><td>OFF</td><td>Green solid</td></tr>
<tr><td>OFF</td><td>OFF</td><td>ON</td><td>Blue solid</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>White solid</td></tr>
</table>
4. Apply signal of green "H" character.
5. Set SW1303 (3), (4), and (5) as shown below, turn VR1300 (CONTRAST) from MIN to MAX, and check as shown in the table below.
<table>
<tr><th>3</th><th>4</th><th>5</th><th>Check object</th></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>White H character</td></tr>
</table></td><td></td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Overall Performance Check (Sync on Green Check)</td><td>MODE M5</td><td>1. Set SW1301 to ANALOG.
2. Apply a full green field signal.
3. Set sync level to 0.2V.
4. Set VR1301 (BRIGHT) fully clockwise.
5. Check the screen that nothing is wrong.</td><td rowspan="2"></td></tr>
<tr><td>MODE M1</td><td>6. Apply a crosshatch reverse signal.
7. Set sync level to 0.4V.
8. Check the screen that nothing is wrong.</td></tr>
</table>

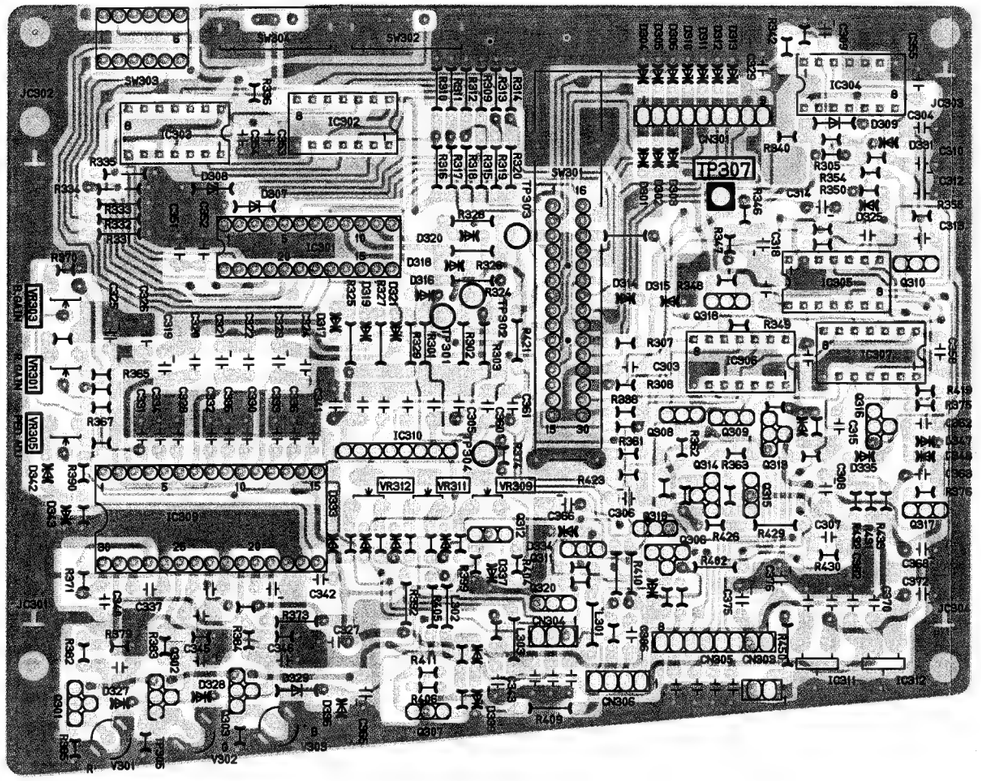
<table>
<tr><th>No.</th><th>ITEM</th><th>SIGNAL TIMING</th><th>CHECK PROCEDURE</th><th>DESCRIPTION</th></tr>
<tr><td>7</td><td>Overall Performance Check (Sync Combination Check)</td><td>MODE M5</td><td>1. Set SW1302 to MANUAL.
2. Combine input signals as shown below and check that nothing is wrong on the screen.
<table><tr><th>Connector / MODE</th><th>INPUT SIGNAL 8 pin</th><th>9 pin</th></tr><tr><td rowspan="4">M5</td><td>$\overline{H}$</td><td>V</td></tr><tr><td>$\overline{H}$</td><td>$\overline{V}$</td></tr><tr><td>HV</td><td>NA</td></tr><tr><td>$\overline{HV}$</td><td>NA</td></tr></table>
3. Set SW1301 to ANALOG.
4. Combine input signal as shown below and check that nothing is wrong on the screen.
<table><tr><th>Connector / MODE</th><th>INPUT SIGNAL 4 pin</th><th>5 pin</th></tr><tr><td rowspan="6">M5</td><td>H</td><td>V</td></tr><tr><td>$\overline{H}$</td><td>V</td></tr><tr><td>H</td><td>$\overline{V}$</td></tr><tr><td>$\overline{H}$</td><td>$\overline{V}$</td></tr><tr><td>HV</td><td>NA</td></tr><tr><td>HV</td><td>SYNC ON Green</td></tr></table></td><td></td></tr>
<tr><td>8</td><td>Overall Performance Check (TTL/ANALOG Switch Operation Check)</td><td>MODE M2</td><td>1. Set SW1301 to ANALOG.
2. Turn video signal on.
3. Apply a full white field signal.
4. Apply a TTL signal and check that the raster on the CRT screen does not converge into one horizontal streak.</td><td></td></tr>
</table>

CIRCUIT BOARD-SOLDER VIEW

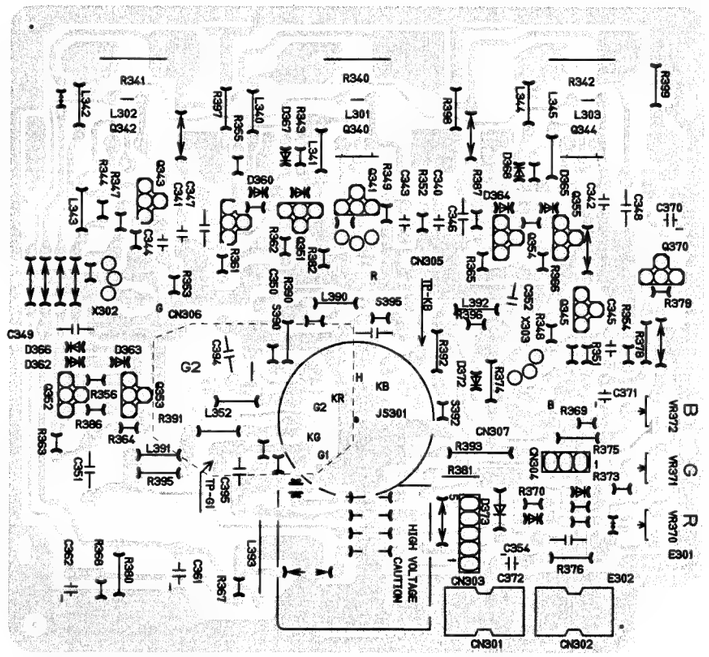
Main Board (TNP890253-31)



J/F Board (TNP800167-31)

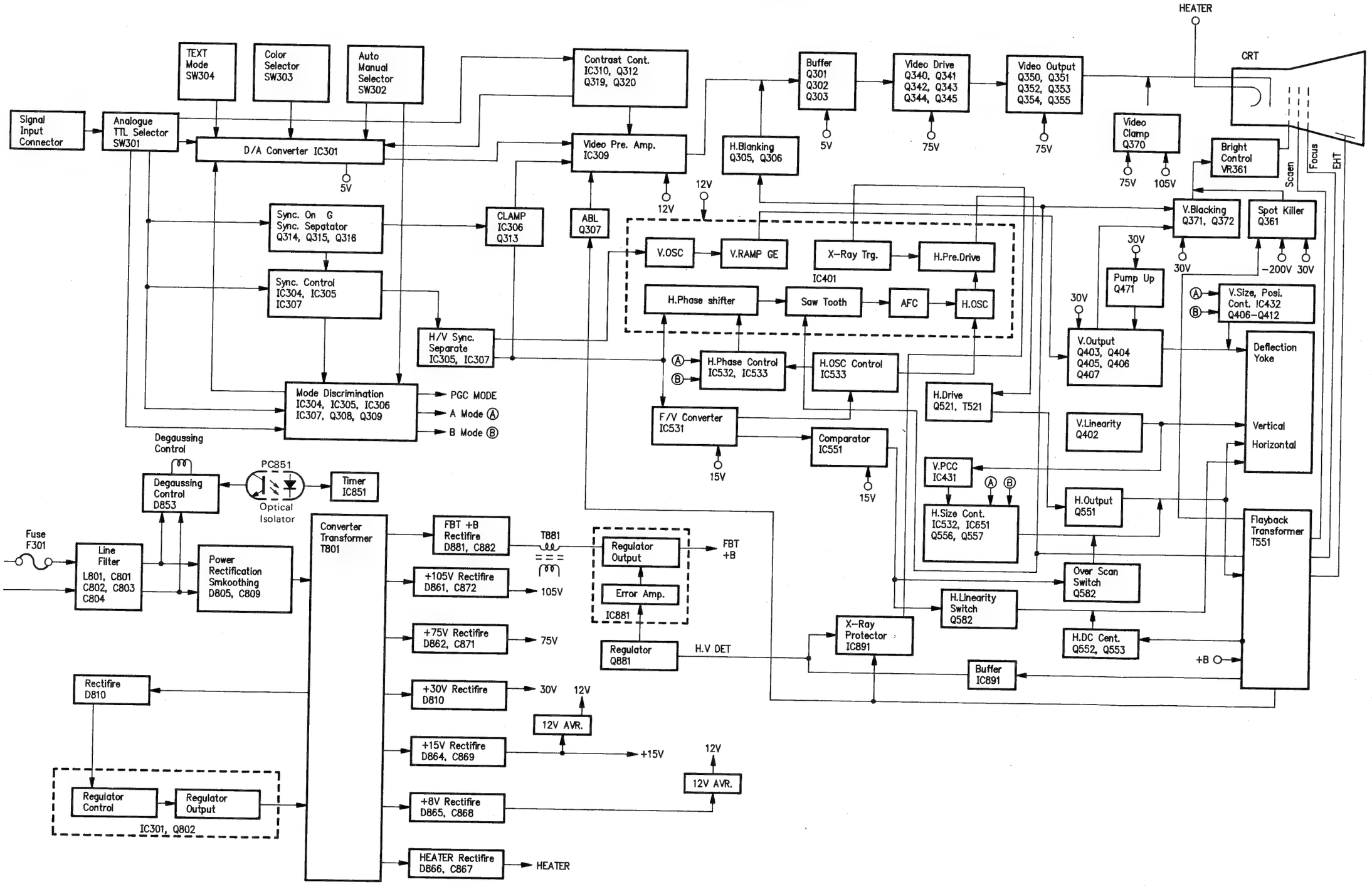


CRT Socket Board (TNP800166-21)



Parts Side pattern
Solder Side pattern

BLOCK DIAGRAM



SCHEMATIC DIAGRAM FOR MODEL TX-1441AE

IMPOTANT SAFETY NOTICE

The component identified by shading or international symbol ⚠ on the following schematic diagrams incorporate special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for those critical components.

NOTES :

1. RESISTOR

All resistors are carbon 1/4W resistor, unless otherwise noted by the following marks.
Unit of resistance is ohm (Ω), (K = 1,000, M = 1,000,000).

- Ⓕ : Non Flammable
- ⊠ : Metal Oxide
- ⊿ : Wire Wound
- ⊗ : Fusible
- △ : Solid
- ◎ : Metal (Precision and high stability)
- : Thermistor
- : Positive coefficient Thermistor

2. CAPACITOR

All capacitors are ceramic 50V capacitor, unless otherwise noted by the following marks.
Unit of capacitance is μF, unless otherwise noted.

- : Electrolytic
- Ⓣ : Tantalum
- Ⓝ : Bipolar
- Z : Z Type
- Ⓜ : Polyester
- ⓜ : Metalized Polyester
- ⊠ : Polypropylene

3. COIL

Unit of inductance is μH, unless otherwise noted.

4. VOLTAGE MEASUREMENT

Voltage is measured by a digital meter with DC 10M OHM/V receiving normal signal.

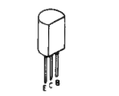
5. This schematic diagram is the letest at the time of printing and is subject to change without notice.

SERVICE NOTES :

This model has a section that does not share a common ground with the power supply section. The different sections are referred to as the HOT section and the COLD section in the precautions below.

1. Do not touch the HOT section and the COLD section at the same time. You may receive an electric shock.
2. Do not short the HOT section to the COLD section. This could blow the fuse or damage parts.
3. Never measure the HOT section and the COLD section at the same time when using tools such as oscilloscopes or multimeters.
4. Always unplug the unit before beginning any operation such as removing the chassis.

TRANSISTOR, IC & DIODE TERMINAL GUIDE



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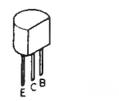
2SC3526H
2SC1383
2SD1211
2SC1360
2SC1685



2SA564A
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2SC1317
2SC1318
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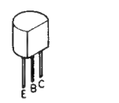
2SC1360



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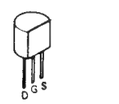

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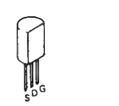

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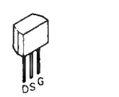

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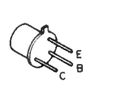

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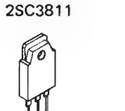

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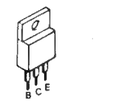

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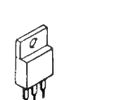

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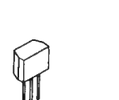

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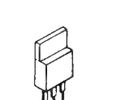

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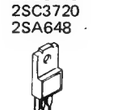

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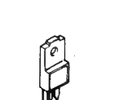

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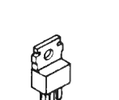

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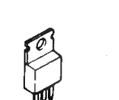

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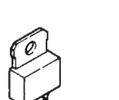

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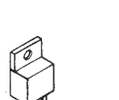

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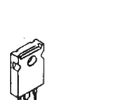

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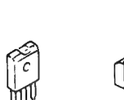

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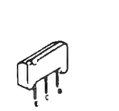

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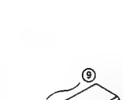

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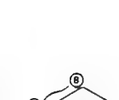

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TC4011BP
AN1084

AN6562
M5223P
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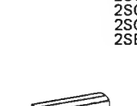

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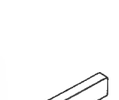
AN5792

AN5763
AN5792



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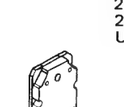

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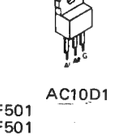

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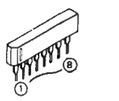

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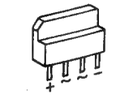
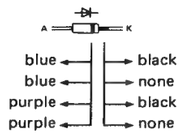
M5216L

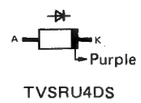


RBV408



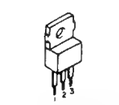
blue ..... black
blue ..... none
purple ..... black
purple ..... none

blue, black BB4A
blue, none BB4
purple, black BB2A
purple, none BB2

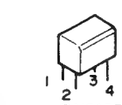


Purple

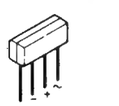
TVSRU4DS



AN7805
AN78L05
AN7809
AN78M12
AN78M08
M5F7805L
M5F7812L
M5F7905L
M5F7824L



ON3105



RB154

Silver
Purple

silver 20E10
purple 10E2

White
Black
Light blue

white MA150
black MA162
light blue MA27

11DQ03

15DF6

Gray ... Brown ... Green
Gray ... Gray ... Blue
Blue ... Blue ... Green
Purple ... Purple ... Yellow

brown·brown·green .....
MA1051M, RD120EB
gray·gray·blue .....
MA1068H
blue·blue·green .....
MA1056L
purple·purple·yellow .....
MA4047

Red ... Brown
Red ... Red

red·brown .....
MA1120M
red·red .....
MA1220M

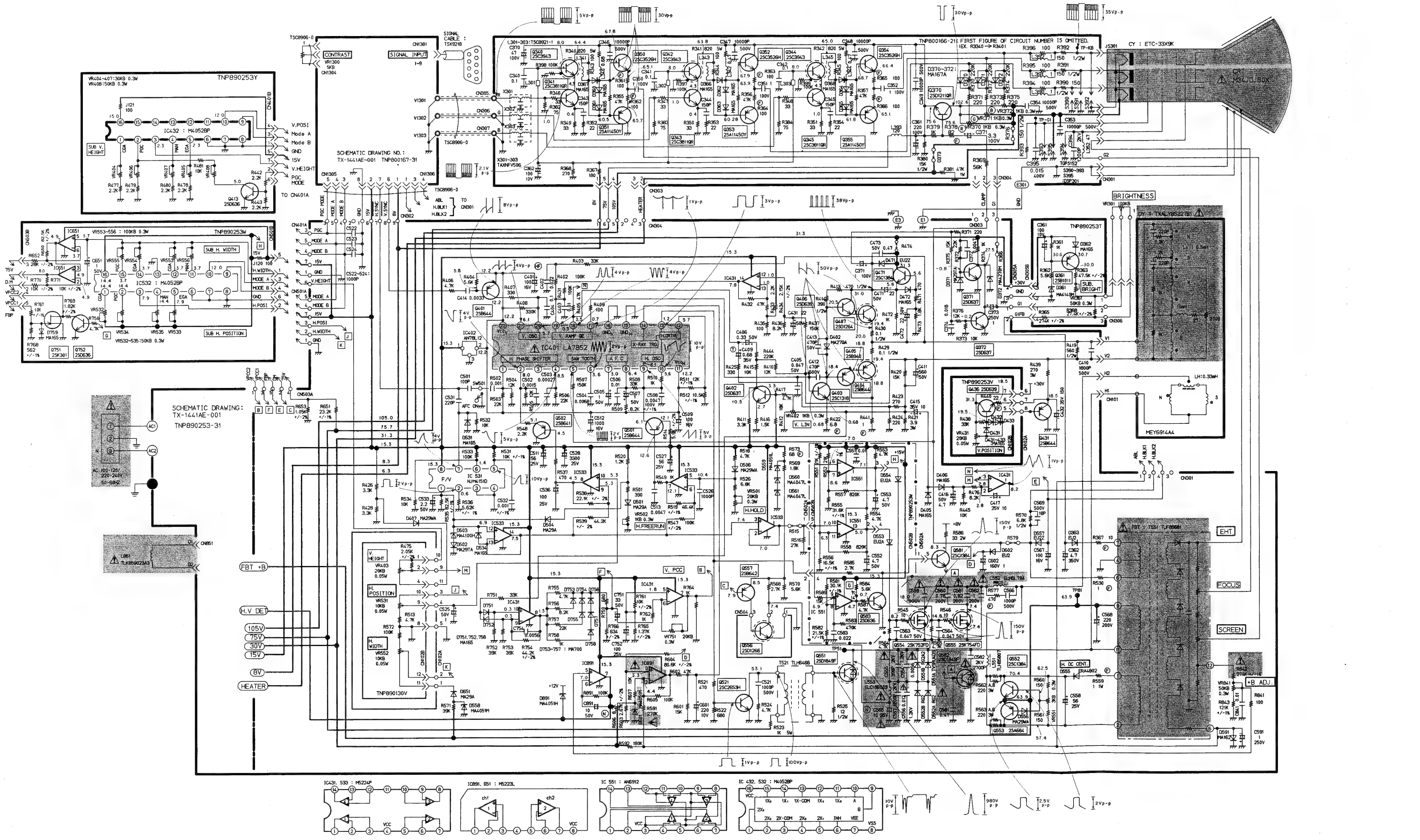
LN217RP

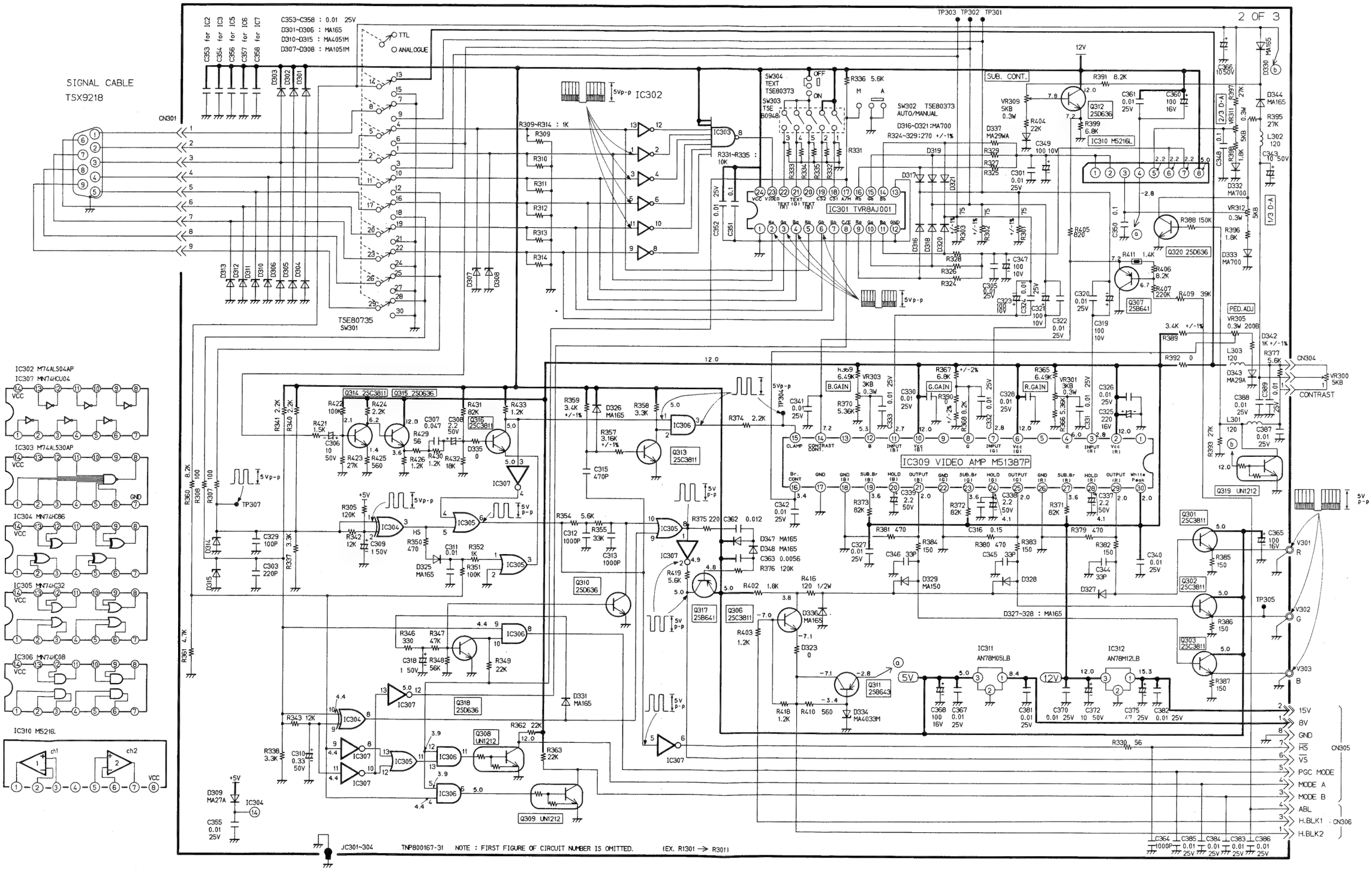
Black

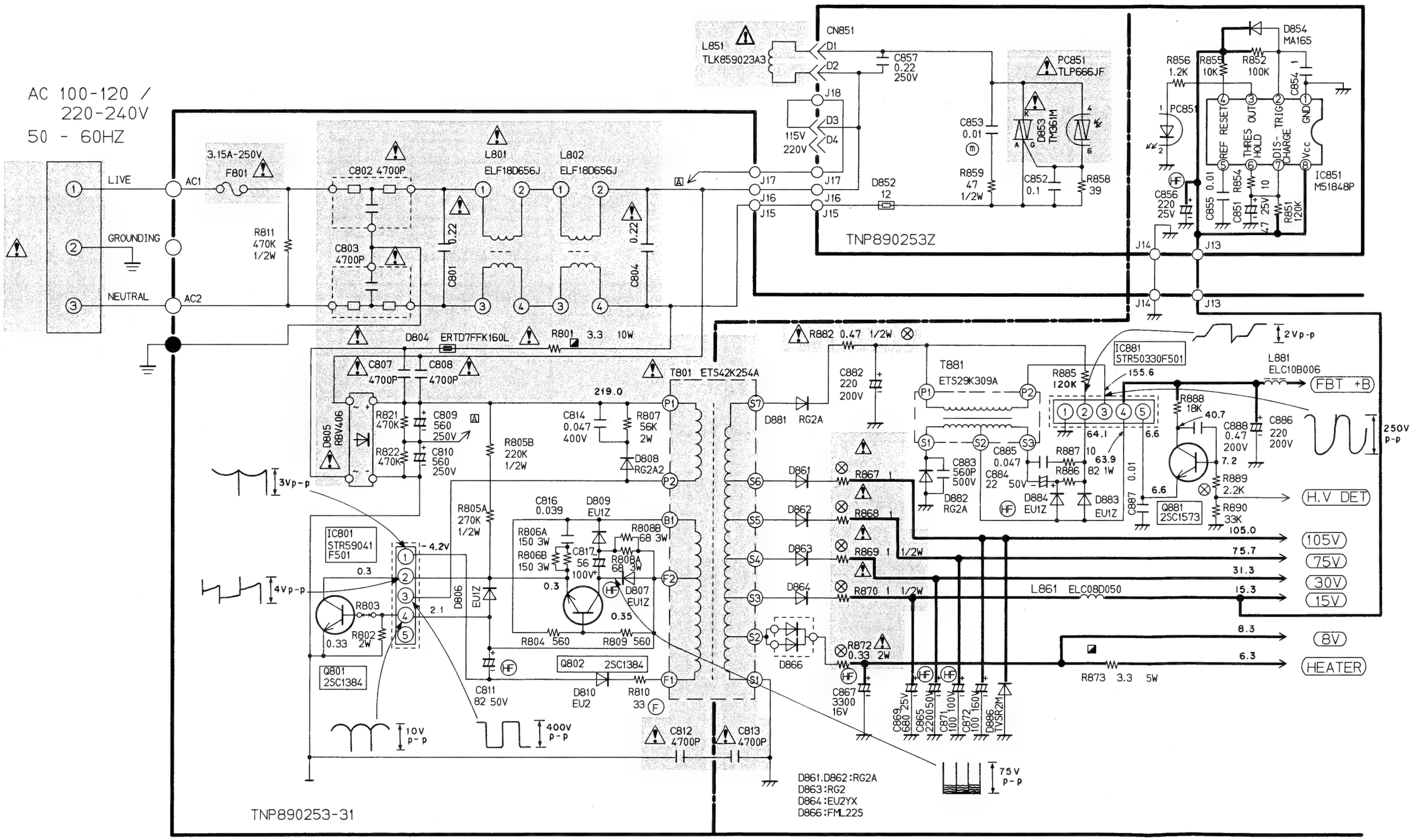
black .....
RD5R6EB3

White
Green
Red
Light blue
Yellow

white MA165
green MA167
red MA29A
light blue MA29WA
yellow MA29TA


SCHEMATIC DRAWING NO.:
TX-1441AE-001 TNP800167-31
SCHEMATIC DRAWING:
TX-1441AE-001
TNP890253-31
TNP890253Y
TNP890253W
TNP890253T
TNP890253V
TNP890130V
CONTRAST
SIGNAL INPUT
BRIGHTNESS
SUB H. WIDTH
SUB H. POSITION
V. POSITION
V. LIN
H. HOLD
H. FREERUN
V. PCC
H. DC CENT.
EHT
FOCUS
SCREEN
+B ADJ.
FBT +B
H.V DET
105V
75V
30V
15V
8V
HEATER
CY : ETC-33X9K
MEY6914A4
IC401 LA7852
IC432 : M4052BP
IC532 : M4052BP
IC431, 533 : M5224P
IC891, 651 : M5223L
IC 551 : AN6912
IC 432, 532 : M4052BP


2 OF 3
SIGNAL CABLE
TSX9218
CN301
TSE80735
SW301
C353~C358 : 0.01 25V
D301~D306 : MA165
D310~D315 : MA4051M
D307~D308 : MA1051M
TTL
ANALOGUE
5Vp-p IC302
R309~R314 : 1K
R331~R335 : 10K
SW304 TEXT TSE80373
SW303 TSE B0948
SW302 TSE80373 AUTO/MANUAL
D316~D321:MA700
R324~329:270 +/-1%
IC301 TVR8AJ001
SUB. CONT.
IC310 M5216L
Q312 2SD636
Q320 2SD636
Q307 2SB641
IC309 VIDEO AMP M51387P
IC311 AN78M05LB
IC312 AN78M12LB
Q314 2SC3811
Q315 2SD636
Q316 2SC3811
Q313 2SC3811
Q310 2SD636
Q318 2SD636
Q308 UN1212
Q309 UN1212
Q317 2SB641
Q306 2SC3811
Q311 2SB643
Q319 UN1212
Q301 2SC3811
Q302 2SC3811
Q303 2SC3811
IC302 M74ALS04AP
IC307 MN74HCU04
IC303 M74ALS30AP
IC304 MN74HC86
IC305 MN74HC32
IC306 MN74HC08
IC310 M5216L
D327~328 : MA165
CN304
CONTRAST
CN305
15V
8V
GND
H
V
PGC MODE
MODE A
MODE B
ABL
CN306
H.BLK1
H.BLK2
V301 R
V302 G
V303 B
JC301~304
TNP800167-31
NOTE : FIRST FIGURE OF CIRCUIT NUMBER IS OMITTED.
(EX. R1301 → R3011)


AC 100-120 /
220-240V
50 - 60HZ
LIVE
GROUNDING
NEUTRAL
AC1
AC2
3.15A-250V
F801
R811
470K
1/2W
C802 4700P
C803
4700P
L801
ELF18D656J
L802
ELF18D656J
C801
0.22
C804
0.22
CN851
L851
TLK859023A3
D1
D2
D3
D4
J18
115V
220V
C857
0.22
250V
J17
J16
J15
D852
12
C853
0.01
R859
47
1/2W
PC851
TLP666JF
D853
TM361M
C852
0.1
R858
39
TNP890253Z
D854
MA165
R856
1.2K
R855
10K
R852
100K
C854
PC851
REF
RESET
THRES
HOLD
OUT
TRIG
DIS-
CHARGE
GND
Vcc
IC851
M51848P
C856
220
25V
C855
0.01
R854
10
C851
47
25V
R851
120K
J14
J13
D804
ERTD7FFK160L
R801
3.3
10W
C807
4700P
C808
4700P
D805
RBV406
R821
470K
R822
470K
C809
560
250V
C810
560
250V
219.0
T801
ETS42K254A
C814
0.047
400V
R807
56K
2W
D808
RG2A2
R805B
220K
1/2W
R805A
270K
1/2W
C816
0.039
D809
EU1Z
R806A
150 3W
R806B
150 3W
C817
56
100V
R808A
68
3W
R808B
68 3W
D807
EU1Z
R804 560
R809 560
C811
82 50V
Q802 2SC1384
D810
EU2
R810
33
IC801
STR59041
F501
R803
R802
2W
Q801
2SC1384
D806
EU1Z
2.1
0.3
0.33
4.2V
3Vp-p
4Vp-p
10V
p-p
400V
p-p
C812
4700P
C813
4700P
R882 0.47 1/2W
C882
220
200V
D881
RG2A
S7
S6
S5
S4
S3
S2
S1
P1
P2
B1
F2
F1
D861
D862
D863
D864
D866
R867
R868
R869 1 1/2W
R870 1 1/2W
R872
0.33 2W
C867
3300
16V
C869
680 25V
C865
2200 50V
C871
100 100V
C872
100 160V
D886
TVSR2M
T881
ETS29K309A
C883
560P
500V
D882
RG2A
C885
0.047
C884
22 50V
D884
EU1Z
D883
EU1Z
C887
0.01
R885
120K
R887
10
R886
82 1W
IC881
STR50330F501
155.6
64.1
63.9
6.6
6.6
Q881
2SC1573
R888
18K
40.7
7.2
C888
0.47
200V
C886
220
200V
R889
2.2K
R890
33K
105.0
L881
ELC10B006
FBT +B
2Vp-p
250V
p-p
H.V DET
105V
75.7
75V
31.3
30V
15.3
15V
L861 ELC08D050
8.3
8V
6.3
HEATER
R873 3.3 5W
75V
p-p
D861.D862:RG2A
D863:RG2
D864:EU2YX
D866:FML22S
TNP890253-31

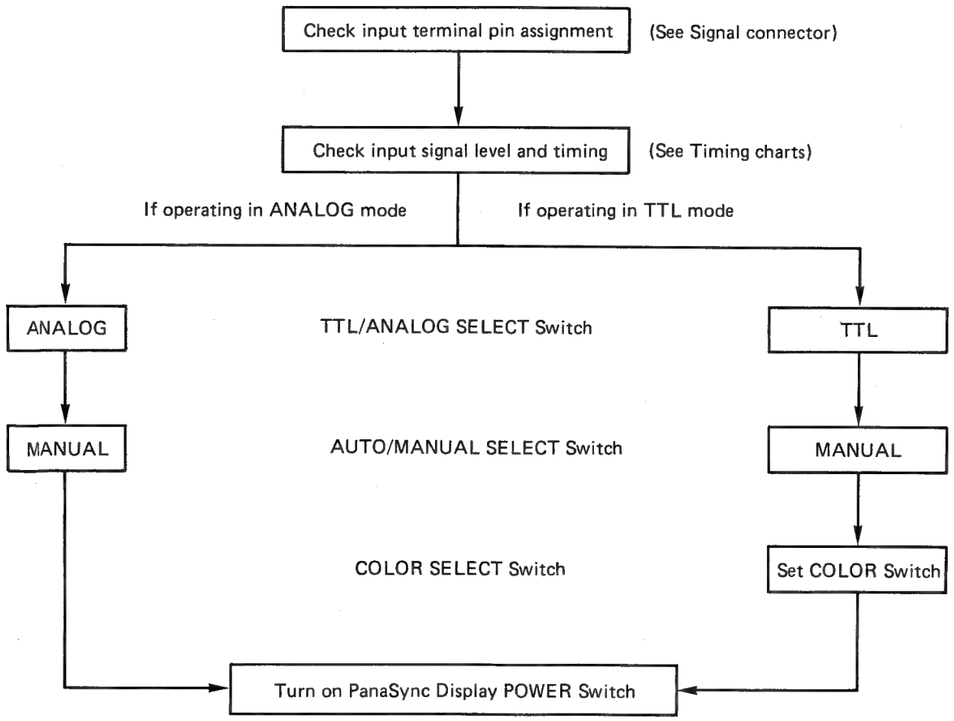
CONNECTIONS

Preparations Before Connection

1. Install the unit on a level and hard surface. Be sure not to obstruct the ventilation holes on the cabinet.
2. Avoid exposing the display to direct sunlight or other bright lights.
3. Before connecting the Computer Display to the personal computer, make sure that both power switches are off.
4. Preset can be made for IBM personal computers or compatible personal computers by the following settings.

TTL/ANALOG Switch	AUTO/MANUAL Switch	Preset mode
TTL	AUTO	IBM CGA or EGA
ANALOG	AUTO	IBM PGC

5. In case of other personal computers than those of IBM compatible, make checking by the following procedures.

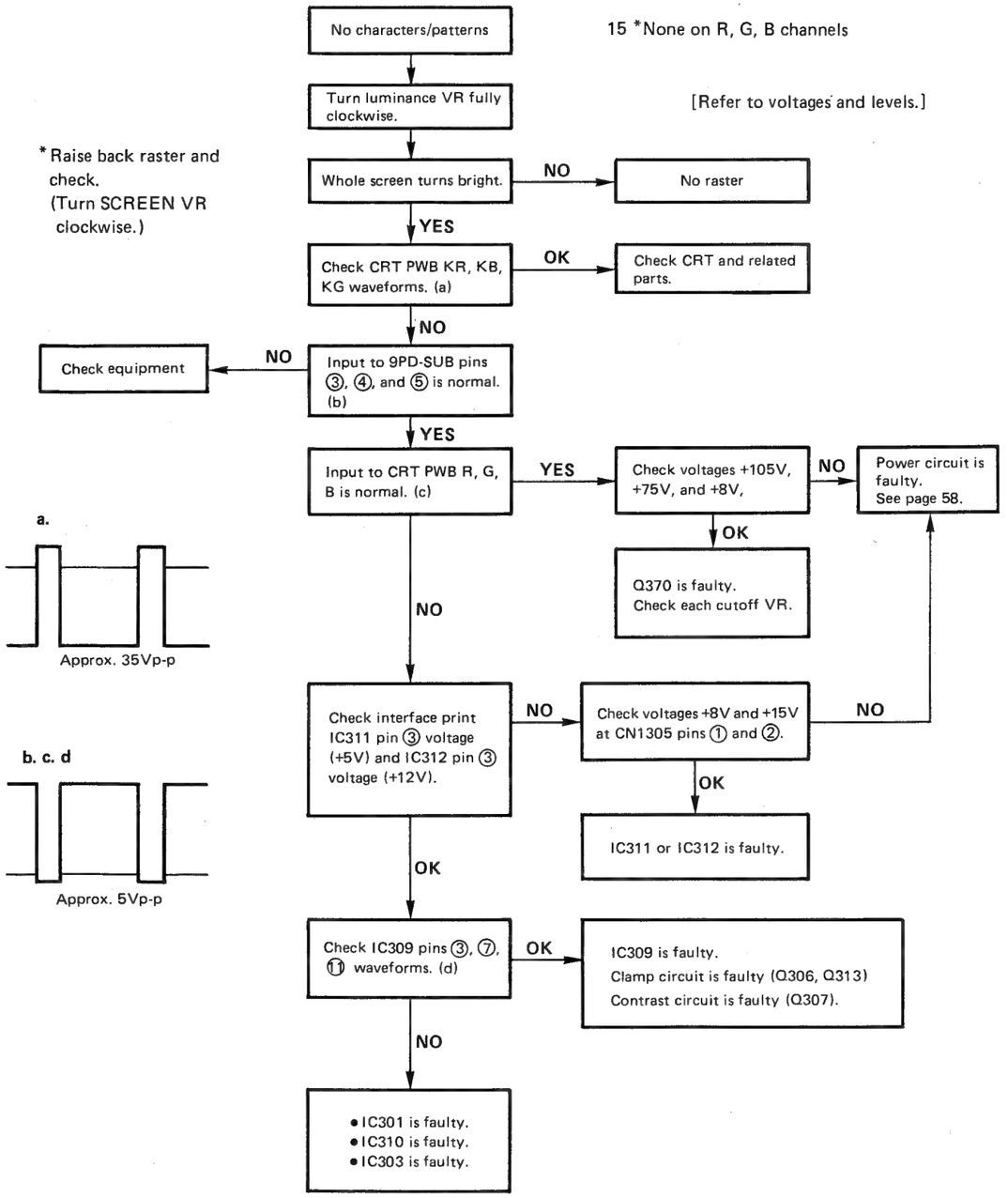


TROUBLE SHOOTING HINTS

Troubleshooting Flowchart

Conditions : Standard conditions Mode 2

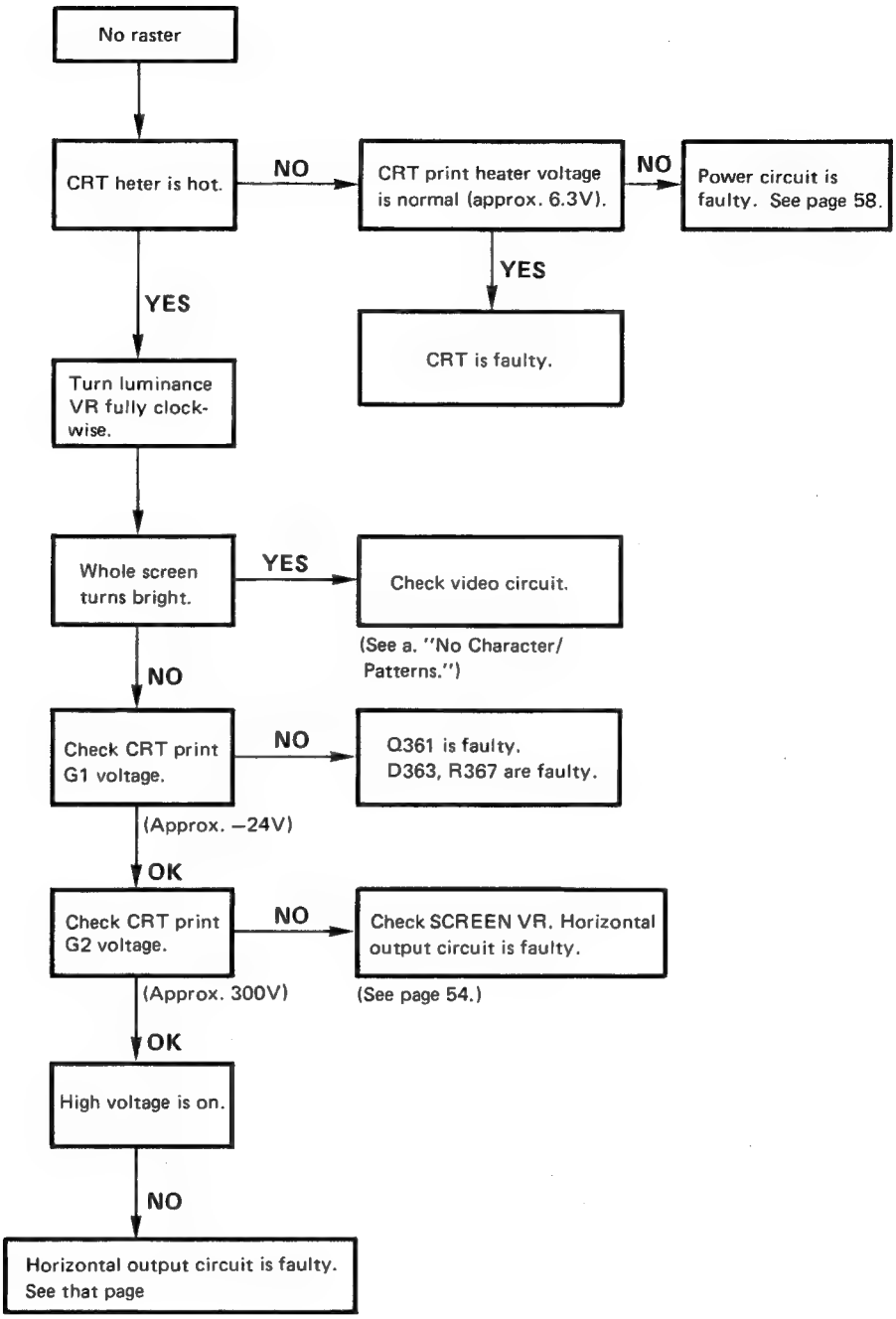
a. No Characters/Patterns



a.

b. c. d

b. No Raster


No raster
CRT heter is hot.
NO
CRT print heater voltage is normal (approx. 6.3V).
NO
Power circuit is faulty. See page 58.
YES
CRT is faulty.
YES
Turn luminance VR fully clock-wise.
Whole screen turns bright.
YES
Check video circuit.
(See a. "No Character/ Patterns.")
NO
Check CRT print G1 voltage.
NO
Q361 is faulty. D363, R367 are faulty.
(Approx. −24V)
OK
Check CRT print G2 voltage.
NO
Check SCREEN VR. Horizontal output circuit is faulty.
(See page 54.)
(Approx. 300V)
OK
High voltage is on.
NO
Horizontal output circuit is faulty. See that page

c. Horizontal Output Circuit Faulty

a

Approx. 10Vp-p

b

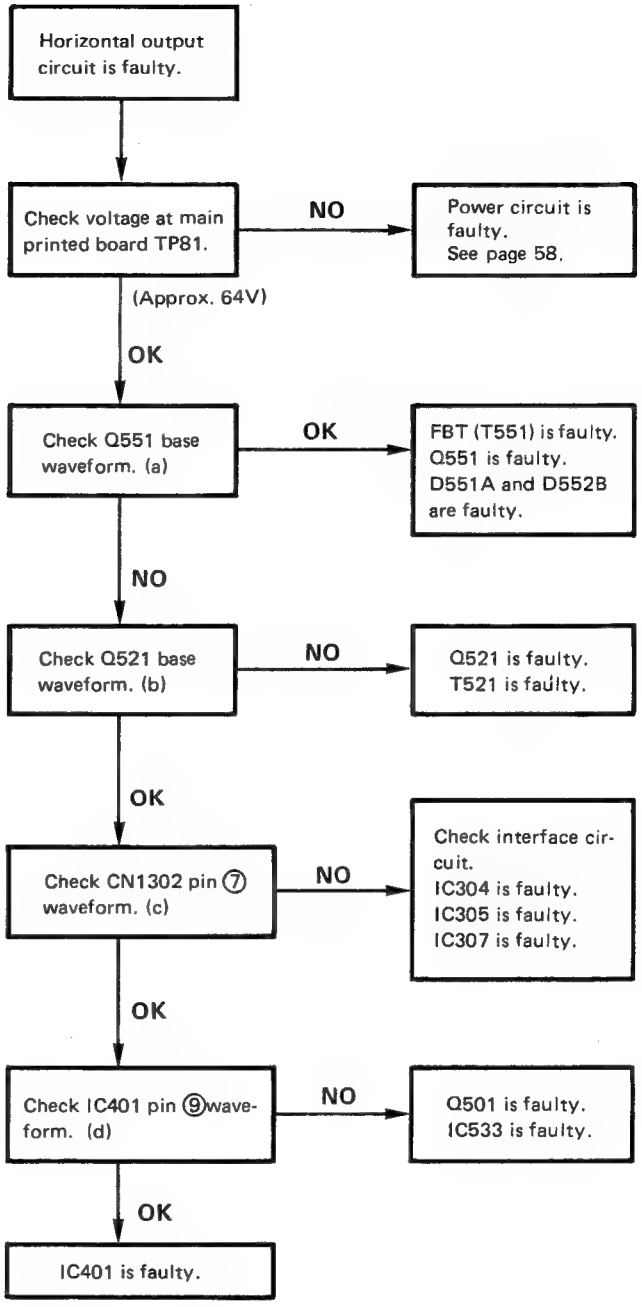
Approx. 1Vp-p

c

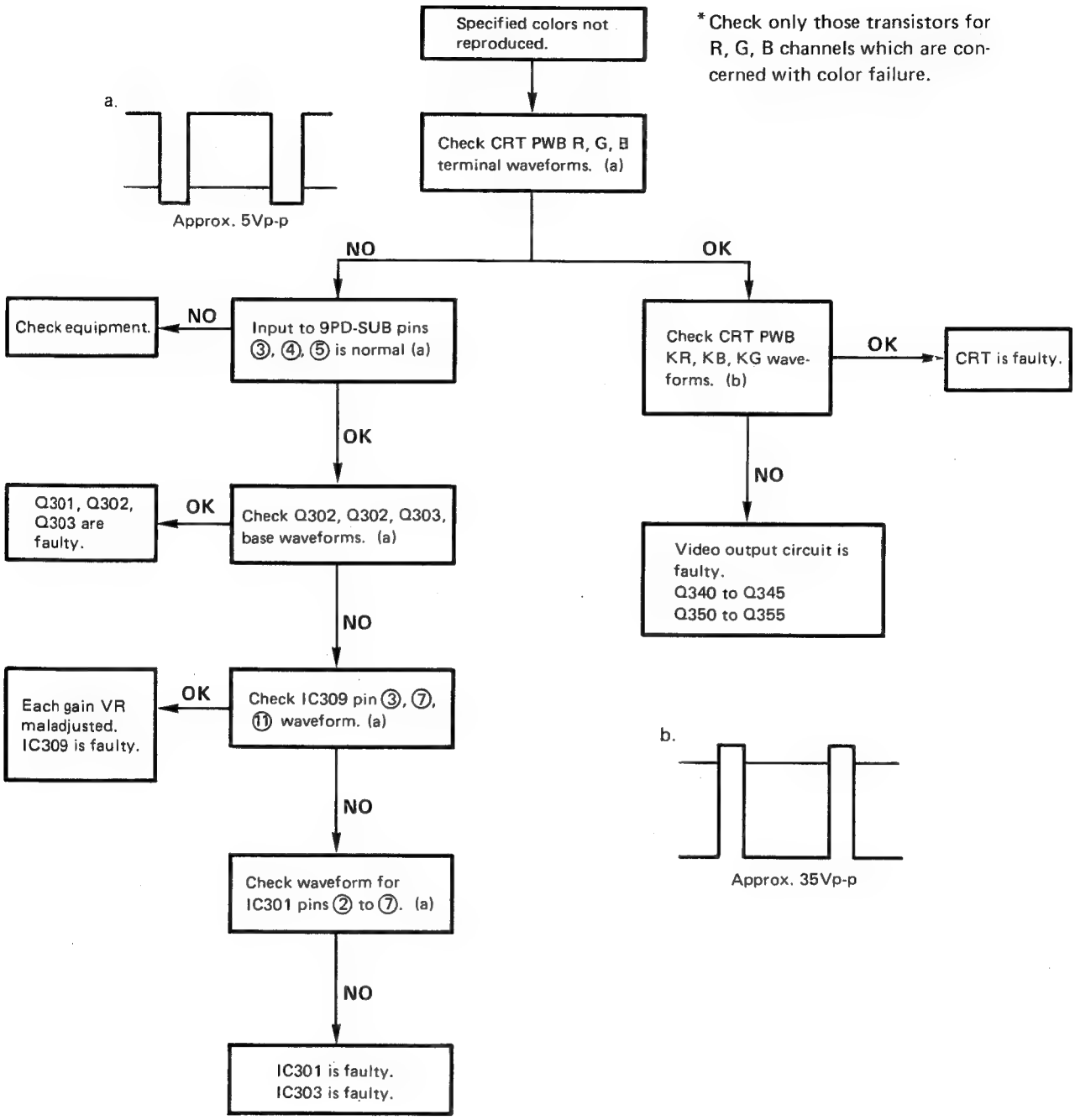
Approx. 5Vp-p

d

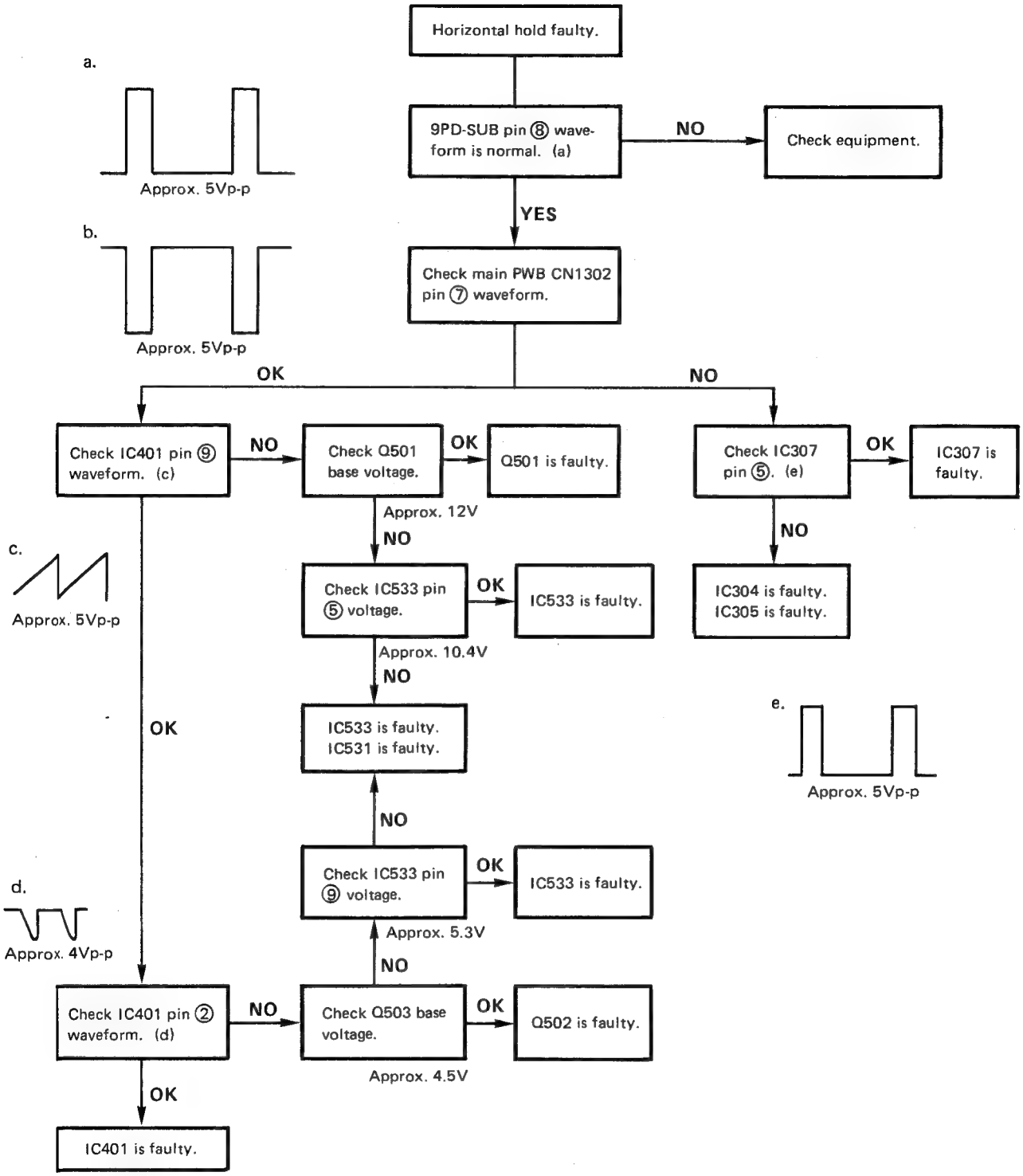
Approx. 5Vp-p



d. Specific Colors Not Reproduced

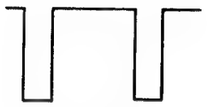


e. Horizontal Hold Faulty



f. Vertical Hold Faulty

a.



Approx. 5Vp-p

b.

Approx. 4Vp-p

c.

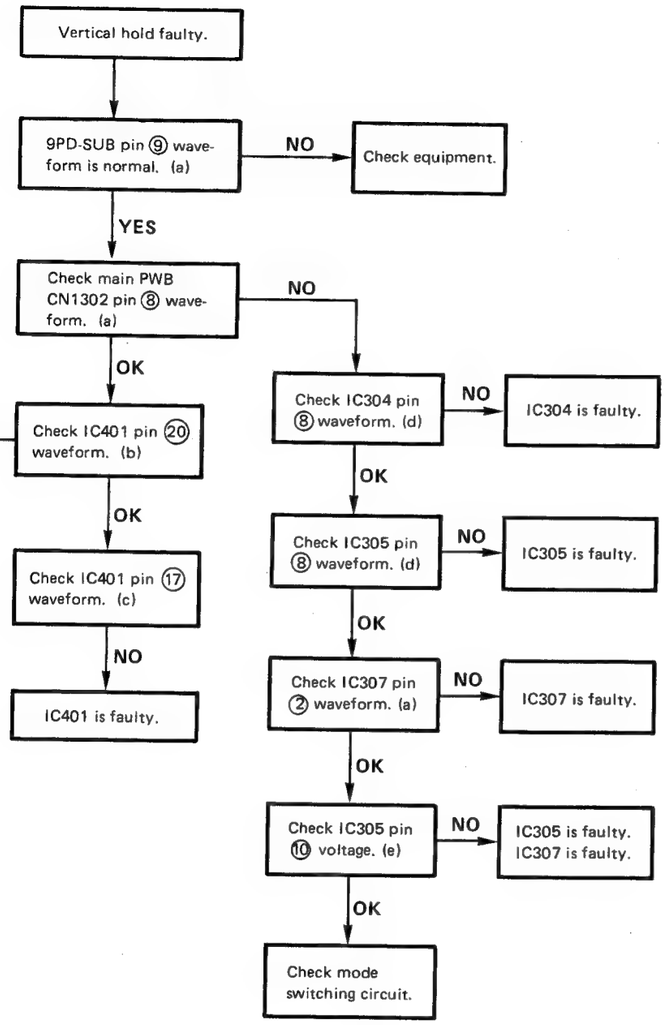
Approx. 1Vp-p

d.

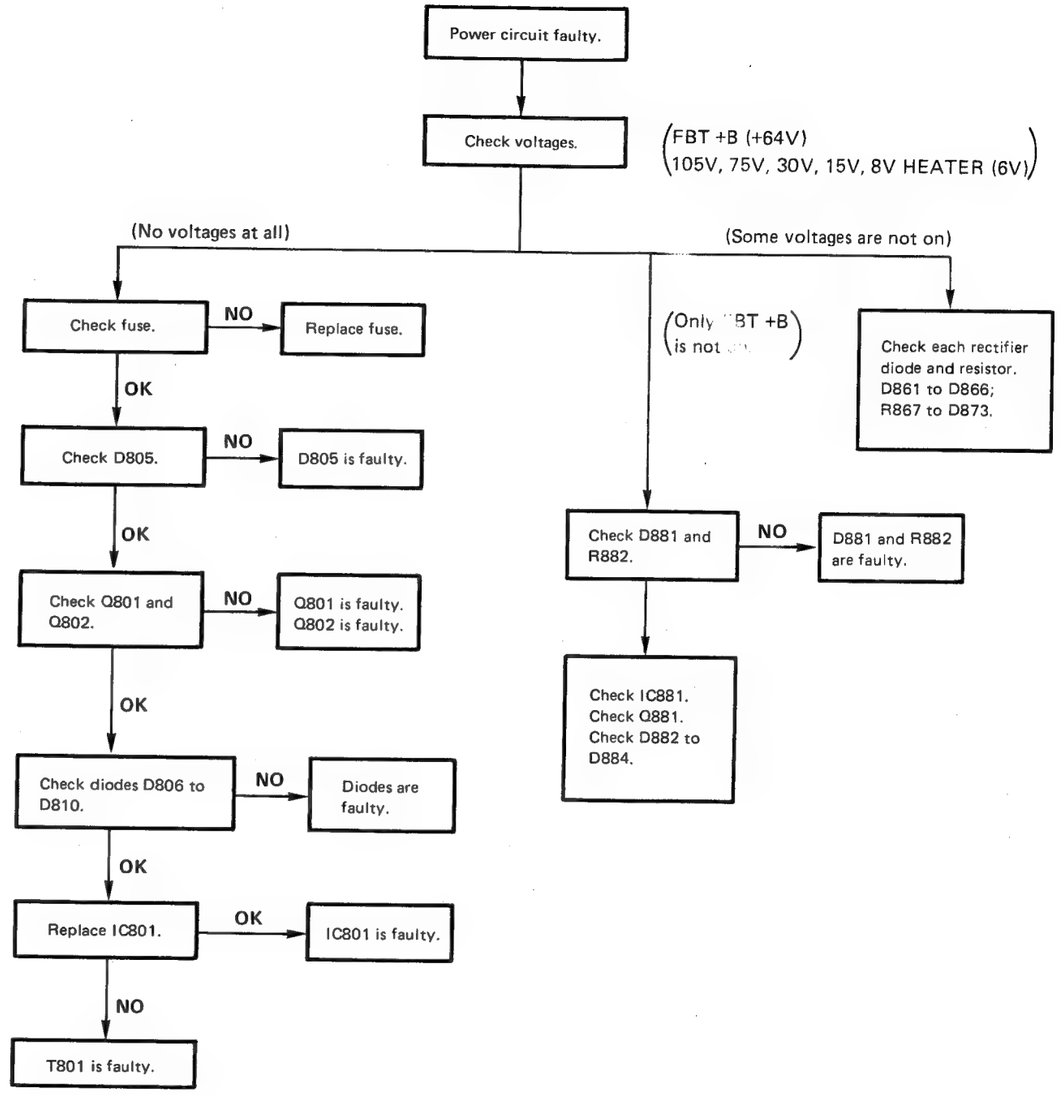
Approx. 5Vp-p

e.

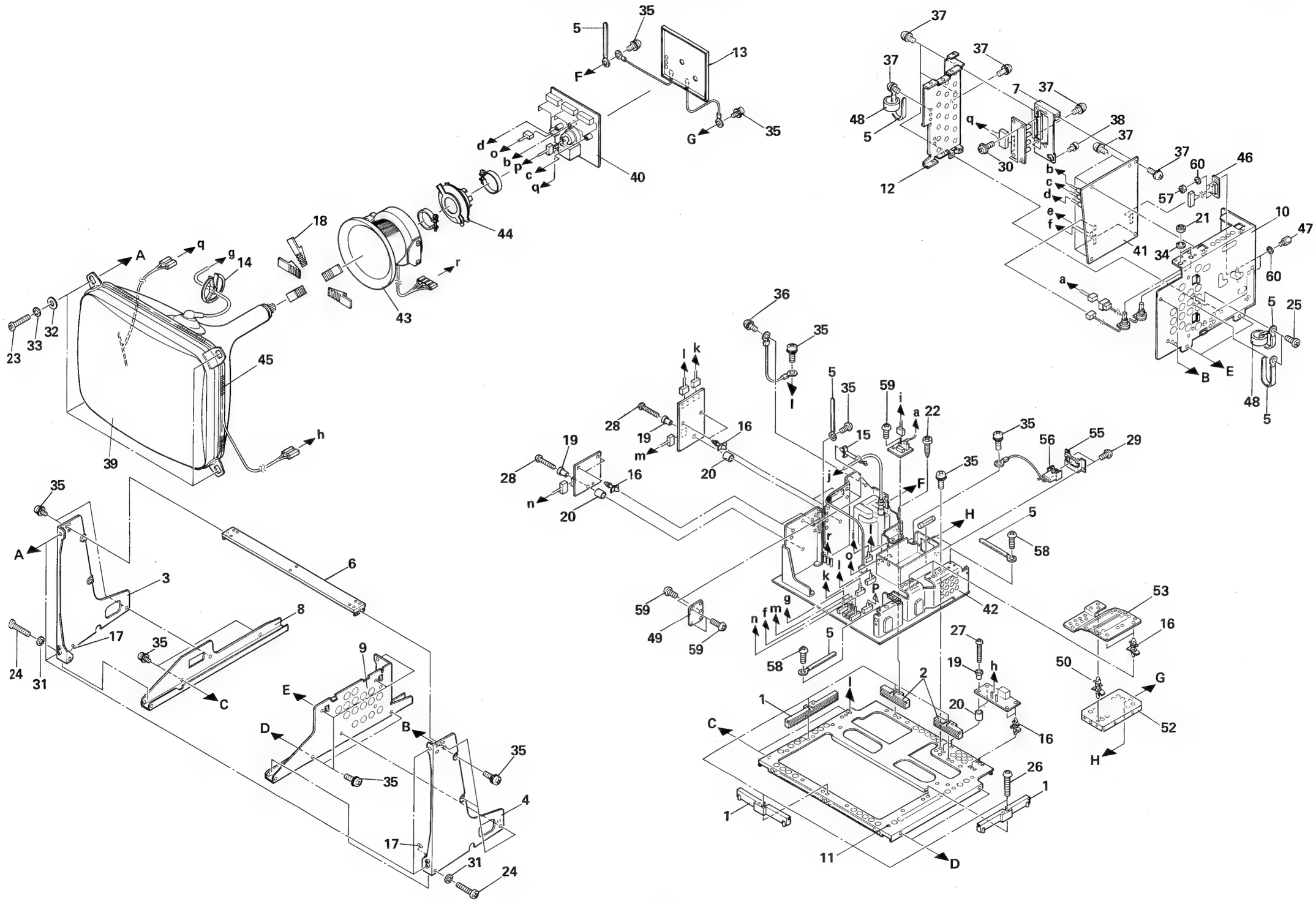
0V



g. Power Circuit Faulty



EXPLODED VIEWS



REPLACEMENT PARTS LIST

Important Safety Notice

Components identified by the International symbol ⚠ have special characteristics important for safety.
When replacing any of these components use only manufacture's specified parts.

RESISTOR

PART NAME & DESCRIPTION			
TYPE		ALLOWANCE	
C	Carbon	F	± 1%
F	Fuse	J	± 5%
M	Metal Oxide	K	± 10%
S	Solid	M	± 20%
W	Wire Wound	G	± 2%

Example: Part No. ERD25TJ104 Ⓒ Description 100K Ⓙ 1/4W

CAPACITOR

PART NAME & DESCRIPTION			
TYPE		ALLOWANCE	
C	Ceramic	C	± 0.25pF
E	Electrolytic	D	± 0.5pF
P	Polyester	F	± 1pF
S	Styrol	J	± 5%
T	Tantalum	K	± 10%
PP	Polypropylene	L	± 15%
		M	± 20%
		P	+100% −0%
		Z	+80% −20%

Example: Part No. ECKF1H103ZF Ⓒ Description 0.01μF Ⓩ 50V

	Ref.No.	Part No.	Description
		CABINET & MAIN PARTS	
⚠	1	TKX854001	PC BOARD HOLDER(BIG)
⚠	2	TKX854101	PC BOARD HOLDER(SMALL)
	3	TUW87908	SIDE PLATE(L)
	4	TUW87909	SIDE PLATE(R)
	5	TUX80701-2	CORD BRACKET(BIG)
		TUX81158	PC BOARD BRACKET
	6	TUX85106-2	UPPER BRACKET
	7	TUX85618	PCB MOUNT BRACKET
	8	TUX87110-1	SIDE PLATE BRACKET(L)
	9	TUX87111-1	SIDE PLATE BRACKET(R)
	10	TUX87112-1	I/F BRACKET
	11	TUX87713-1	BOTTOM PLATE
	12	TUC85980	SHIELD PLATE(I/F)
	13	TUC87522	SHIELD PLATE(CRT PCB)
⚠		TBM870063-2	MODEL PLATE
		TES5201	SPRING(CRT EARTH)
	14	TMM15404-1	SPACER RING
		TMM15414	CLAMPER(SMALL)
		TMM16419	EDGE BARRIER
	15	TMM16452	CLAMPER(ANODE)BIG
		TMM6463	CLAMPER
		TMM81416	CORD BAND(SMALL)
	16	TMM81460	LOCKING SUPPORT
		TMM81461	PUSH RIVET
		TMM81481	PCB SPACER
		TMM85407	SPACER
	17	TMM85417	BARRIER
⚠	18	TMM85511	RUBBER(WEDGE)
		TMM85610	LEAD TUBE
	19	TMM87701	BUSHING
	20	TMM87702	COLLAR
		TMK84549	PARMALLOY(BIG)
		TMK84557	PARMALLOY(SMALL)
		TMK85537	BARRIER
	21	XNS8	NUT
	22	XTB4+16A	SCREW
	23	XTB4+16F	SCREW
	24	XTB4+35B	SCREW
	25	XTB4+8F	SCREW
		XTV3+12A	SCREW
	26	XTV3+16F	SCREW
	27	XTV3+20F	SCREW
	28	XTV3+20J	SCREW
	29	XTV3+8F	SCREW
	30	XTW3+8L	SCREW
	31	XWA4B	WASHER
	32	XWA5B	WASHER
		XWC3BFN	WASHER
	33	XWG5H17	WASHER
	34	XWS8A	WASHER
	35	XYA4+EF8	SCREW
	36	XYE3+EC8	SCREW
	37	XYE3+EF8	SCREW
	38	XYN3+C6	SCREW
⚠	39	M34JDJ80X	PICTURE TUBE
⚠	40	TNP800166-21	PC BOARD W/COMPONENT(CRT)
	41	TNP800167-31	PC BOARD W/COMPONENT(I/F)
⚠	42	TNP890253-31	PC BOARD W/COMPONENT(M)
⚠	43	TXALY85327B1	DEFLECTION YOKE
	44	ETC-33X9K	CONVERGENCE COIL
⚠	45	TLK859023A3	DEGAUSS COIL
	46	TSX9218	9P CONNECTOR CORD(D-SUB)
⚠	47	TJT8907B	SOCKET
		TXAJTE3P1250	3P CONNECTOR ASSY
		TXAJTE3P1251	3P CONNECTOR ASSY
		TXAJTT2P405	2P CONNECTOR ASSY
⚠	48	TSC8906-0	FERRITE CORE(BIG)
		TSN85511	MAGNET
	VR301	EVH60AF20B15	CONTROL B 100K OHM
	VR1300	EVH60AF20B53	CONTROL B 5K OHM
		T4F31519Q	POLYESTER TAPE(20M)

	Ref.No.	Part No.	Description
		T4F72425Q	COTTON TAPE(55M)
		T4F80918-1	TAPE
		T4F90219-1	MAIRA TAPE(20M)
		TPC8811001	OUTER CARTON
		TXAPD11441AE	FILLER
		TPE814055	SET COVER
		TQE616	BAG
⚠		TQD8712001	PTB PASS SHEET
		TQF81259	SERIAL NO LABEL
⚠		TQF82706	WARNING LABEL
⚠		TQF85210	HIGH VOLTAGE LABEL
		TQF86205-1	CONTROL LABEL
		TQF86206-1	SELECT/TEXT LABEL
		TQF86207	CONTRAST LABEL
		TQF86208	BRIGHT LABEL
⚠		TQF87296	PTB LABEL
		I.C	
⚠	IC401	LA7852	INTEGRATED CIRCUIT
	IC402	AN78L12	INTEGRATED CIRCUIT
	IC431	M5224P	INTEGRATED CIRCUIT
	IC432	M4052BP	INTEGRATED CIRCUIT
	IC531	NJM4151D	INTEGRATED CIRCUIT
	IC532	M4052BP	INTEGRATED CIRCUIT
	IC533	M5224P	INTEGRATED CIRCUIT
	IC551	AN6912	INTEGRATED CIRCUIT
	IC651	M5223L	INTEGRATED CIRCUIT
	IC801	STR59041F501	INTEGRATED CIRCUIT
	IC851	M51848P	INTEGRATED CIRCUIT
	IC881	STR50330F501	INTEGRATED CIRCUIT
⚠	IC891	M5223L	INTEGRATED CIRCUIT
	IC1301	TVR8AJ001	INTEGRATED CIRCUIT
	IC1302	M74ALS04AP	INTEGRATED CIRCUIT
	IC1303	M74ALS30AP	INTEGRATED CIRCUIT
	IC1304	MN74HC86	INTEGRATED CIRCUIT
	IC1305	MN74HC32	INTEGRATED CIRCUIT
	IC1306	MN74HC08	INTEGRATED CIRCUIT
	IC1307	MN74HCU04	INTEGRATED CIRCUIT
	IC1309	M51387P	INTEGRATED CIRCUIT
	IC1310	M5216L	INTEGRATED CIRCUIT
	IC1311	AN78M05	INTEGRATED CIRCUIT
	IC1312	AN78M12	INTEGRATED CIRCUIT
		TRANSISTORS	
	Q361	2SB1011	TRANSISTOR
	Q371	2SD637R	TRANSISTOR
	Q372	2SD637R	TRANSISTOR
	Q401	2SB644S	TRANSISTOR
	Q402	2SD637R	TRANSISTOR
	Q403	2SC1318R	TRANSISTOR
	Q404	2SB644S	TRANSISTOR
	Q405	2SB940AP	TRANSISTOR
	Q406	2SD639R	TRANSISTOR
	Q407	2SD1264AP	TRANSISTOR
	Q413	2SD636R	TRANSISTOR
	Q431	2SB644S	TRANSISTOR
	Q436	2SD639R	TRANSISTOR
	Q471	2SC1384AR	TRANSISTOR
	Q501	2SB644S	TRANSISTOR
	Q502	2SB641R	TRANSISTOR
	Q521	2SC2653H	TRANSISTOR
	Q551	2SD1849F	TRANSISTOR
	Q552	2SC1384AR	TRANSISTOR
	Q553	2SA684R	TRANSISTOR
	Q554	2SK752FD	TRANSISTOR
	Q555	2SK754FDLT	TRANSISTOR
	Q556	2SD1266R	TRANSISTOR
	Q557	2SB642Q	TRANSISTOR
	Q581	2SC1384S	TRANSISTOR
⚠	Q582	2SD1849F	TRANSISTOR
	Q583	2SD636R	TRANSISTOR
	Q751	2SK301Q	TRANSISTOR
	Q752	2SD636R	TRANSISTOR
	Q801	2SC1384AR	TRANSISTOR
	Q802	2SC1384AR	TRANSISTOR
	Q881	2SC1573QNC	TRANSISTOR
	Q1301	2SC3811R	TRANSISTOR
	Q1302	2SC3811R	TRANSISTOR
	Q1303	2SC3811R	TRANSISTOR
	Q1306	2SC3811R	TRANSISTOR
	Q1307	2SB641R	TRANSISTOR
	Q1308	UN1212	TRANSISTOR
	Q1309	UN1212	TRANSISTOR
	Q1310	2SD636R	TRANSISTOR
	Q1311	2SB643S	TRANSISTOR
	Q1312	2SD636R	TRANSISTOR
	Q1313	2SC3811R	TRANSISTOR
	Q1314	2SC3811R	TRANSISTOR
	Q1315	2SD636R	TRANSISTOR
	Q1316	2SC3811R	TRANSISTOR
	Q1317	2SB641R	TRANSISTOR
	Q1318	2SD636R	TRANSISTOR
	Q1319	UN1212	TRANSISTOR
	Q1320	2SD636R	TRANSISTOR
	Q3340	2SC3943	TRANSISTOR
	Q3341	2SC3811R	TRANSISTOR
	Q3342	2SC3943	TRANSISTOR
	Q3343	2SC3811R	TRANSISTOR
	Q3344	2SC3943	TRANSISTOR
	Q3345	2SC3811R	TRANSISTOR
	Q3350	2SC3526H	TRANSISTOR
	Q3351	2SA1145OY	TRANSISTOR
	Q3352	2SC3526H	TRANSISTOR
	Q3353	2SA1145OY	TRANSISTOR
	Q3354	2SC3526H	TRANSISTOR
	Q3355	2SA1145OY	TRANSISTOR
	Q3370	2SD1211R	TRANSISTOR
		DIODES	
	D361	MA4140M	DIODE
	D362	MA165	DIODE
	D363	EU2	DIODE.SI
	D371	MA29TA	DIODE
	D372	MA427OM	DIODE.SI
	D402	MA27QA	DIODE
	D405	MA165	DIODE
	D406	MA165	DIODE
	D407	MA29WA	DIODE
	D431	MA165	DIODE
	D432	MA165	DIODE
	D433	MA165	DIODE
	D471	EU2Z	DIODE.SI
	D472	MA165	DIODE
	D501	MA29A	DIODE

	Ref.No.	Part No.	Description
	D502	MA29TA	DIODE
	D503	MA4100H	DIODE.SI
	D504	MA29A	DIODE
	D506	MA29WA	DIODE
	D531	MA165	DIODE
	D534	MA165	DIODE
	D551A	TVSRU4DS	DIODE
	D551B	RG2A2	DIODE.SI
	D552A	TVSRG2	DIODE.SI
	D552B	TVSRG2	DIODE.SI
	D553	EU2A	DIODE.SI
	D554	EU2A	DIODE.SI
	D555	ERA48O2	DIODE.SI
	D556	MA29WA	DIODE
	D557	EU2Z	DIODE.SI
	D558	MA4051M	DIODE
	D559	MA4051L	DIODE
	D560	MA4047L	DIODE.SI
	D561	MA4047L	DIODE.SI
	D591	MA162	DIODE
⚠	D6O1	MA4051M	DIODE
	D6O2	EU2	DIODE.SI
	D651	MA29A	DIODE
	D751	MA165	DIODE
	D752	MA165	DIODE
	D753	MA700	DIODE.SI
	D754	MA700	DIODE.SI
	D755	MA700	DIODE.SI
	D756	MA700	DIODE.SI
	D757	MA700	DIODE.SI
	D758	MA165	DIODE
	D759	MA165	DIODE
	D8O4	ERTD7FFK16OL	THERMISTOR
	D8O5	RBV406	DIODE.SI
	D8O6	EU1Z	DIODE
	D8O7	EU1Z	DIODE
	D8O8	RG2A2	DIODE.SI
	D8O9	EU1Z	DIODE
	D810	EU2	DIODE.SI
	D852	ERPF5B0M120G	POSISTOR
⚠	D853	TM361ML	DIODE.SI
	D854	MA165	DIODE
	D861	TVSRG2A	DIODE
	D862	TVSRG2A	DIODE
	D863	TVSRG2	DIODE.SI
	D864	EU2YX	DIODE.SI
	D866	FML22S	DIODE.SI
	D881	TVSRG2A	DIODE
	D882	TVSRG2A	DIODE
	D883	EU1Z	DIODE
	D884	EU1Z	DIODE
	D886	TVSR2M	DIODE
	D891	MA4051H	DIODE.SI
	D13O1	MA165	DIODE
	D13O2	MA165	DIODE
	D13O3	MA165	DIODE
	D13O4	MA165	DIODE
	D13O5	MA165	DIODE
	D13O6	MA165	DIODE
	D13O7	MA1051M	DIODE
	D13O8	MA1051M	DIODE
	D13O9	MA27A	DIODE

	Ref.No.	Part No.	Description
	D1310	MA4051M	DIODE
	D1311	MA4051M	DIODE
	D1312	MA4051M	DIODE
	D1313	MA4051M	DIODE
	D1314	MA4051M	DIODE
	D1315	MA4051M	DIODE
	D1316	MA700	DIODE.SI
	D1317	MA700	DIODE.SI
	D1318	MA700	DIODE.SI
	D1319	MA700	DIODE.SI
	D1320	MA700	DIODE.SI
	D1321	MA700	DIODE.SI
	D1325	MA165	DIODE
	D1326	MA165	DIODE
	D1327	MA165	DIODE
	D1328	MA165	DIODE
	D1329	MA150	DIODE
	D1330	MA165	DIODE
	D1331	MA165	DIODE
	D1332	MA700	DIODE.SI
	D1333	MA700	DIODE.SI
	D1334	MA4033M	DIODE.SI
	D1336	MA165	DIODE
	D1337	MA29WA	DIODE
	D1343	MA29A	DIODE
	D1344	MA165	DIODE
	D1347	MA165	DIODE
	D1348	MA165	DIODE
	D3360	MA165	DIODE
	D3361	MA165	DIODE
	D3362	MA165	DIODE
	D3363	MA165	DIODE
	D3364	MA165	DIODE
	D3365	MA165	DIODE
	D3366	MA165	DIODE
	D3367	MA165	DIODE
	D3368	MA165	DIODE
	D3370	MA167A	DIODE.SI
	D3371	MA167A	DIODE.SI
	D3372	MA167A	DIODE.SI
		COIL & TRANSFORMERS	
	L551	TLH85807	COIL
⚠	L552	ELH5L704	COIL
⚠	L553	ELC18B009	CHOKE COIL
⚠	L801	ELF18D656J	COIL TRANS
⚠	L802	ELF18D656J	COIL TRANS
	L861	ELC08D050	CHOKE COIL
	L881	ELC10B006	CHOKE COIL
	L1301	TLU121K186	PEAKING COIL
	L1302	TLU121K186	PEAKING COIL
	L1303	TLU121K186	PEAKING COIL
	L3301	TSC8921-1	FERRITE CORE
	L3302	TSC8921-1	FERRITE CORE
	L3303	TSC8921-1	FERRITE CORE
	L3340	TLUR68M186	PEAKING COIL
	L3341	TLU1R0M186	PEAKING COIL
	L3342	TLUR47M186	PEAKING COIL
	L3343	TLU1R0M186	PEAKING COIL
	L3344	TLUR47M186	PEAKING COIL
	L3345	TLU1R0M186	PEAKING COIL
	L3352	TLU470K186	PEAKING COIL

	Ref.No.	Part No.	Description
	L3390	TLU1ROM186	PEAKING COIL
	L3391	TLU1ROM186	PEAKING COIL
	L3392	TLU1ROM186	PEAKING COIL
	L3393	TLU121K106C	PEAKING COIL
⚠	PC851	TLP666JF	TRANS
	T521	TLH6466	COIL
⚠	T551	TLF85681	FLYBACK TRANS
⚠	T801	ETS42K254A	TRANS
	T881	ETS29K309A	TRANS
		CONTROL	
	VR361	EVN32CA00B54	CONTROL B 50K OHM
	VR402	EVN32CA00B13	CONTROL B 1K OHM
	VR403	EVUF3AE25B24	CONTROL B 20K OHM
	VR404	EVM4HGA00B34	CONTROL B 30K OHM
	VR405	EVM4HGA00B34	CONTROL B 30K OHM
	VR406	EVM4HGA00B34	CONTROL B 30K OHM
	VR407	EVM4HGA00B34	CONTROL B 30K OHM
	VR408	EVM4HGA00B54	CONTROL B 50K OHM
	VR431	EVUF3AE25B24	CONTROL B 20K OHM
	VR501	EVN32CA00B24	CONTROL B 20K OHM
	VR502	EVN32CA00B13	CONTROL B 1K OHM
	VR531	EVUF3AE25B14	CONTROL B 10K OHM
	VR532	EVM4HGA00B54	CONTROL B 50K OHM
	VR533	EVM4HGA00B54	CONTROL B 50K OHM
	VR534	EVM4HGA00B54	CONTROL B 50K OHM
	VR535	EVM4HGA00B54	CONTROL B 50K OHM
	VR551	EVM31GA00B33	CONTROL B 3K OHM
	VR552	EVUF3AE25B14	CONTROL B 10K OHM
	VR553	EVM4HGA00B15	CONTROL B 100K OHM
	VR554	EVM4HGA00B15	CONTROL B 100K OHM
	VR555	EVM4HGA00B15	CONTROL B 100K OHM
	VR556	EVM4HGA00B15	CONTROL B 100K OHM
	VR751	EVN32CA00B24	CONTROL B 20K OHM
	VR841	EVN32CA00B54	CONTROL B 50K OHM
	VR1301	EVM4HGA00B33	CONTROL B 3K OHM
	VR1303	EVM4HGA00B33	CONTROL B 3K OHM
	VR1305	EVM4HGA00B22	CONTROL B 200 OHM
	VR1309	EVM4HGA00B53	CONTROL B 5K OHM
	VR1311	EVM4HGA00B53	CONTROL B 5K OHM
	VR1312	EVM4HGA00B53	CONTROL B 5K OHM
	VR3370	EVM4HGA00B13	CONTROL B 1K OHM
	VR3371	EVM4HGA00B13	CONTROL B 1K OHM
	VR3372	EVM4HGA00B13	CONTROL B 1K OHM
		CAPACITORS	
	C361	ECEA1AG101S	E 100UF 10V
	C362	ECEA2VG4R7S	E 4.7UF 350V
	C371	ECEA2AGE010	E 1UF 100V
	C372	ECQB1H472JZ	P 4700PF J 50V
	C373	ECEA2EG010S	E 1UF 250V
	C374	ECQB1H183JZ	P 0.018UF J 50V
	C401	ECEA1CF101	E 100UF 16V
	C402	ECQB1H223JZ	P 0.022UF J 50V
	C403	ECQB1H103JZ	P 0.01UF J 50V
	C404	ECQV1H104JZ	P 0.1UF J 50V
	C405	ECKF1H473ZF	C 0.047UF Z 50V
	C406	ECEA1HGER33	E 0.33UF 50V
	C409	ECSF1VE684Y	T 0.68UF 35V
	C410	ECKD2H182KB2	C 1800PF K 500V
	C411	ECEA1HFE561	E 560UF 50V
	C412	ECKD2H471KB2	C 470PF K 500V
	C413	ECKF1H471KB	C 470PF K 50V
	C414	ECQB1H332JZ	P 3300PF J 50V
	C415	ECSF1VE106YE	T 10UF 35V
	C416	ECEA1HG4R7S	E 4.7UF 50V
	C417	ECEA1EG100S	E 10UF 25V
	C431	ECEA1HG220S	E 22UF 50V
	C432	ECEA1VFE151	E 150UF 35V
	C471	ECEA1HNX220	E 22UF 50V
	C472	ECEA1HNX220	E 22UF 50V
	C473	ECQV1H474JZ	P 0.47UF J 50V
	C501	ECCF1H101J	C 100PF J 50V
	C502	ECQK1152JZ	P 1500PF J 100V
	C503	ECQP1H271JZ	PP 270PF J 50V
	C504	ECQB1H682JZ	P 6800PF J 50V
	C505	ECEA1HG010S	E 1UF 50V
	C506	ECQK1103JZ	P 0.01UF J 100V
	C507	ECEA1HG010S	E 1UF 50V
	C508	ECQP1472FZ	PP 4700PF F 100V
	C509	ECEA1CF101	E 100UF 16V
	C511	ECEA1EFE560	E 56UF 25V
	C512	ECEA1CGE102	E 1000UF 16V
	C513	ECQB1H472JZ	P 4700PF J 50V
	C521	ECKD2H102KB2	C 1000PF K 500V
	C522	ECKF1H102KB	C 1000PF K 50V
	C523	ECKF1H102KB	C 1000PF K 50V
	C524	ECKF1H102KB	C 1000PF K 50V
	C525	ECEA1HG010S	E 1UF 50V
	C526	ECKF1H102KB	C 1000PF K 50V
	C527	ECEA1EFE560	E 56UF 25V
	C528	ECEA1EGE332	E 3300UF 25V
	C531	ECCF1H221J	C 220PF J 50V
	C532	ECQP1H102FZ	PP 1000PF F 50V
	C533	ECEA1HG2R2S	E 2.2UF 50V
	C536	ECEA1EG101S	E 100UF 25V
	C551	ECKF1H103ZF	C 0.01UF Z 50V
	C552	ECEA1HG4R7S	E 4.7UF 50V
	C553	ECEA1HG4R7S	E 4.7UF 50V
	C554	ECWH12H562HS	PP 5600PF H 1.2KV
⚠	C555	ECKC3D391JBN	C 390PF J 2KV
	C556	ECWH12H123JS	PP 0.012UF J 1.2KV
	C557	ECKC3D122JBN	C 1200PF J 2KV
	C558	ECEA1EFE560	E 56UF 25V
⚠	C559	ECWF2H105JNY	PP 1.0UF J 500V
⚠	C560	ECWF2H784R65	PP 0.78UF R 500V
⚠	C561	ECWF2H824R65	PP 0.82UF 500V
⚠	C562	ECWF2H105JNY	PP 1.0UF J 500V
	C563	ECQV1H473JZ	P 0.047UF J 50V
	C564	ECQV1H473JZ	P 0.047UF J 50V
⚠	C565	ECEA1VW100	E 10UF 35V
	C566	ECKD2H102KB2	C 1000PF K 500V
	C567	ECEA1CG101S	E 100UF 16V
	C568	ECOS2DG221E	E 220UF 200V
	C569	ECCD2H180J	C 18PF J 500V
⚠	C581	ECQM1H474JV	P 0.47UF J 50V
	C582	ECKC3D272JBN	C 2700PF J 2KV
	C583	ECQB1H223JZ	P 0.022UF J 50V
	C591	ECEA2EG010S	E 1UF 250V
	C601	ECEA1AG221S	E 220UF 10V
	C602	ECEA2CG010S	E 1UF 160V
	C651	ECEA1HG010S	E 1UF 50V
	C751	ECEA1HGE330	E 33UF 50V
	C752	ECEA1EG101S	E 100UF 25V

	Ref.No.	Part No.	Description				Ref.No.	Part No.	Description			
	C754	ECQB1H562JZ	P	5600PF	J	50V	C1332	ECBT1E103ZF5	C	0.01UF	Z	25V
⚠	C801	ECQU2A224MNS	PP	0.22UF	M	250V	C1333	ECBT1E103ZF5	C	0.01UF	Z	25V
⚠	C802	TAXDSR472M	CERAMIC FILTER				C1337	ECEA1HG2R2S	E	2.2UF		50V
⚠	C803	TAXDSR472M	CERAMIC FILTER				C1338	ECEA1HG2R2S	E	2.2UF		50V
⚠	C804	ECQU2A224MNS	PP	0.22UF	M	250V	C1339	ECEA1HG2R2S	E	2.2UF		50V
⚠	C807	ECKCNS472MFJ	C	4700PF	M		C1340	ECBT1E103ZF5	C	0.01UF	Z	25V
⚠	C808	ECKCNS472MFJ	C	4700PF	M		C1341	ECBT1E103ZF5	C	0.01UF	Z	25V
	C809	ECOS2EG561U	E	560UF		250V	C1342	ECBT1E103ZF5	C	0.01UF	Z	25V
	C810	ECOS2EG561U	E	560UF		250V	C1343	ECEA1HG100S	E	10UF		50V
	C811	ECEA1HFE820	E	82UF		50V	C1344	ECCF1H330JC	C	33PF	J	50V
⚠	C812	ECKCNS472MFJ	C	4700PF	M		C1345	ECCF1H330JC	C	33PF	J	50V
⚠	C813	ECKCNS472MFJ	C	4700PF	M		C1346	ECCF1H330JC	C	33PF	J	50V
	C814	ECQM4473KZ	P	0.047UF	K	400V	C1347	ECEA1AG101S	E	100UF		10V
	C816	ECQV1H393JZ	P	0.039UF	J	50V	C1348	ECQV1H104JZ	P	0.1UF	J	50V
	C817	ECEA2AFE560	E	56UF		100V	C1349	ECEA1AG101S	E	100UF		10V
	C841	ECQB1H103JZ	P	0.01UF	J	50V	C1350	ECQV1H104JZ	P	0.1UF	J	50V
	C851	ECEA25V47TU	E	47UF		25V	C1351	ECQV1H104JZ	P	0.1UF	J	50V
	C852	ECQV1H104JZ	P	0.1UF	J	50V	C1352	ECBT1E103ZF5	C	0.01UF	Z	25V
	C853	ECQE2A103M	P	0.01UF	M	250V	C1353	ECBT1E103ZF5	C	0.01UF	Z	25V
	C854	ECQV1H105JZ	P	1.0UF	J	50V	C1354	ECBT1E103ZF5	C	0.01UF	Z	25V
	C857	ECQE2224KSB	P	0.22UF	K	250V						
	C855	ECKF1H103ZF	C	0.01UF	Z	50V	C1355	ECBT1E103ZF5	C	0.01UF	Z	25V
	C856	ECEA1EFE221	E	220UF		25V	C1356	ECBT1E103ZF5	C	0.01UF	Z	25V
	C865	ECEA1HFE222	E	2200UF		50V	C1357	ECBT1E103ZF5	C	0.01UF	Z	25V
	C867	ECEA1CFE332	E	3300UF		16V	C1358	ECBT1E103ZF5	C	0.01UF	Z	25V
	C869	ECEA1EFE681	E	680UF		25V	C1360	ECEA1CG101S	E	100UF		16V
	C871	ECEA2AFE101	E	100UF		100V	C1361	ECBT1E103ZF5	C	0.01UF	Z	25V
	C872	ECEA2CG101S	E	100UF		160V	C1362	ECQB1H123JZ	P	0.012UF	J	50V
	C882	ECOS2DG221E	E	220UF		200V	C1363	ECQB1H562JZ	P	5600PF	J	50V
	C883	ECKD2H561KB2	C	560PF	K	500V	C1364	ECKF1H102KB	C	1000PF	K	50V
	C884	ECEA1HNX220	E	22UF		50V	C1365	ECEA1CG101S	E	100UF		16V
	C885	ECQV1H473JZ	P	0.047UF	J	50V	C1366	ECEA1HG100S	E	10UF		50V
	C886	ECOS2DG221E	E	220UF		200V	C1367	ECBT1E103ZF5	C	0.01UF	Z	25V
	C887	ECQB1H103JZ	P	0.01UF	J	50V	C1368	ECEA1CG101S	E	100UF		16V
	C888	ECQM2474KZ	P	0.47UF	K	200V	C1370	ECBT1E103ZF5	C	0.01UF	Z	25V
	C891	ECEA1HGN100	E	10UF		50V	C1372	ECEA1HG100S	E	10UF		50V
	C1301	ECBT1E103ZF5	C	0.01UF	Z	25V	C1375	ECEA1EG470S	E	47UF		25V
	C1303	ECCF1H221J	C	220PF	J	50V	C1381	ECBT1E103ZF5	C	0.01UF	Z	25V
	C1305	ECBT1E103ZF5	C	0.01UF	Z	25V	C1382	ECBT1E103ZF5	C	0.01UF	Z	25V
	C1306	ECEA1HG100S	E	10UF		50V	C1383	ECBT1E103ZF5	C	0.01UF	Z	25V
	C1307	ECQV1H473JZ	P	0.047UF	J	50V	C1384	ECBT1E103ZF5	C	0.01UF	Z	25V
	C1308	ECEA1HG2R2S	E	2.2UF		50V	C1385	ECBT1E103ZF5	C	0.01UF	Z	25V
	C1309	ECEA1HG010S	E	1UF		50V	C1386	ECBT1E103ZF5	C	0.01UF	Z	25V
	C1310	ECEA1HGR33	E	0.33UF		50V	C1387	ECBT1E103ZF5	C	0.01UF	Z	25V
	C1311	ECQB1H103JZ	P	0.01UF	J	50V	C1388	ECBT1E103ZF5	C	0.01UF	Z	25V
	C1312	ECKF1H102KB	C	1000PF	K	50V	C1389	ECBT1E103ZF5	C	0.01UF	Z	25V
	C1313	ECKF1H102KB	C	1000PF	K	50V	C3340	ECQV1H104JZ	P	0.1UF	J	50V
	C1315	ECCF1H471J	C	470PF	J	50V	C3341	ECQV1H104JZ	P	0.1UF	J	50V
	C1316	ECQV1H154JZ	P	0.15UF	J	50V	C3342	ECQV1H104JZ	P	0.1UF	J	50V
	C1318	ECEA1HG010S	E	1UF		50V	C3343	ECCF1H151J	C	150PF	J	50V
	C1319	ECEA1AG101S	E	100UF		10V	C3344	ECCF1H151J	C	150PF	J	50V
	C1320	ECBT1E103ZF5	C	0.01UF	Z	25V	C3345	ECCF1H151J	C	150PF	J	50V
	C1321	ECEA1AG101S	E	100UF		10V	C3346	ECKD2H103PU	C	0.01UF	P	500V
	C1322	ECBT1E103ZF5	C	0.01UF	Z	25V	C3347	ECKD2H103PU	C	0.01UF	P	500V
	C1323	ECEA1AG101S	E	100UF		10V	C3348	ECKD2H103PU	C	0.01UF	P	500V
	C1324	ECBT1E103ZF5	C	0.01UF	Z	25V	C3349	ECKD2H103PU	C	0.01UF	P	500V
	C1325	ECEA1CG221S	E	220UF		16V	C3350	ECQE1105KN	P	1.0UF	K	100V
	C1326	ECBT1E103ZF5	C	0.01UF	Z	25V	C3351	ECQE1105KN	P	1.0UF	K	100V
	C1327	ECBT1E103ZF5	C	0.01UF	Z	25V	C3352	ECQE1105KN	P	1.0UF	K	100V
	C1328	ECBT1E103ZF5	C	0.01UF	Z	25V	C3353	ECKD2H103PU	C	0.01UF	P	500V
	C1329	ECCF1H101J	C	100PF	J	50V	C3354	ECKD2H103PU	C	0.01UF	P	500V
	C1330	ECBT1E103ZF5	C	0.01UF	Z	25V	C3361	ECEA2AG221S	E	220UF		100V
	C1331	ECBT1E103ZF5	C	0.01UF	Z	25V	C3362	ECEA1AG101S	E	100UF		10V

Ref.No.	Part No.	Description
C3370	ECEA2AGE470	E 47UF 100V
C3371	ECEA2AGE3R3	E 3.3UF 100V
C3394	ECKC3D122JBN	C 1200PF J 2KV
C3395	ECQE4153KZ	P 0.015UF K 400V
R502	ECKF1H102KB	C 1000PF K 50V
	RESISTORS	
D1323	ERDS2TC0	C 0 OHM 1/4W
D1335	ERDS2TC0	C 0 OHM 1/4W
D1342	EROS2CKF1001	M 1K OHM F 1/4W
J120	ERD25FJ101K	C 100 OHM J 1/4W
J121	ERDS2TJ101	C 100 OHM J 1/4W
R361	ERDS2TJ102	C 1K OHM J 1/4W
R362	ERDS2TJ562	C 5.6K OHM J 1/4W
R363	EROS2CKG4752	M 47.5K OHM G 1/4W
R365	EROS2CKG2743	M 274K OHM G 1/4W
R367	ERD25FJ100K	C 10 OHM J 1/4W
R368	EROS2CKG2742	M 27.4K OHM G 1/4W
R371	ERDS2TJ221	C 220 OHM J 1/4W
R372	ERDS2TJ223	C 22K OHM J 1/4W
R373	ERDS2TJ103	C 10K OHM J 1/4W
R374	ERDS2TJ102	C 1K OHM J 1/4W
R375	ERDS2TJ153	C 15K OHM J 1/4W
R376	ERD25FJ123K	C 12K OHM J 1/4W
R402	ERDS2TJ104	C 100K OHM J 1/4W
R403	ERDS2TJ333	C 33K OHM J 1/4W
R404	ERDS2TJ562	C 5.6K OHM J 1/4W
R405	ERDS2TJ473	C 47K OHM J 1/4W
R406	ERDS2TJ472	C 4.7K OHM J 1/4W
R407	ERDS2TJ331	C 330 OHM J 1/4W
R408	ERDS2TJ334	C 330K OHM J 1/4W
R409	ERD25FJ101K	C 100 OHM J 1/4W
R410	ERDS2TJ123	C 12K OHM J 1/4W
R411	ERDS2TJ332	C 3.3K OHM J 1/4W
R412	ERDS2TJ183	C 18K OHM J 1/4W
R413	ERDS1FJ471	C 470 OHM J 1/2W
R414	ERDS1FJ391	C 390 OHM J 1/2W
R415	ERDS2TJ103	C 10K OHM J 1/4W
R416	ERDS2TJ152	C 1.5K OHM J 1/4W
R417	ERD25FJ472K	C 4.7K OHM J 1/4W
R419	ERDS1FJ561	C 560 OHM J 1/2W
R420	ERDS2TJ153	C 15K OHM J 1/4W
R421	ERX3ANJ3R9	M 3.9 OHM J 3W
R422	ERD25FJ6R8K	C 6.8 OHM J 1/4W
R423	ERDS2TJ271	C 270 OHM J 1/4W
R424	ERDS2TJ221	C 220 OHM J 1/4W
R425	ERDS2TJ331	C 330 OHM J 1/4W
R426	ERDS2TJ332	C 3.3K OHM J 1/4W
R428	ERDS2TJ332	C 3.3K OHM J 1/4W
R429	ERW12PKR10	W 0.10 OHM K 1/2W
R430	ERW12PKR10	W 0.10 OHM K 1/2W
R431	ERDS2TJ104	C 100K OHM J 1/4W
R432	ERDS2TJ473	C 47K OHM J 1/4W
R433	ERDS2TJ222	C 2.2K OHM J 1/4W
R434	EROS2CKG2151	M 2.15K OHM G 1/4W
R435	ERDS2TJ101	C 100 OHM J 1/4W
R436	ERDS2TJ822	C 8.2K OHM J 1/4W
R437	ERDS2TJ154	C 150K OHM J 1/4W
R438	ERDS2TJ333	C 33K OHM J 1/4W
R439	ERG3ANJ271	M 270 OHM J 3W
R440	ERD25FJ220K	C 22 OHM J 1/4W
R441	ERD25FJ1R0K	C 1 OHM J 1/4W
R442	ERDS2TJ222	C 2.2K OHM J 1/4W
R443	ERDS2TJ222	C 2.2K OHM J 1/4W
R444	ERDS2TJ224	C 220K OHM J 1/4W
R445	ERDS2TJ103	C 10K OHM J 1/4W
R471	ERDS2TJ471	C 470 OHM J 1/4W
R472	ERDS2TJ102	C 1K OHM J 1/4W
R473	ERDS2TJ182	C 1.8K OHM J 1/4W
R475	EROS2CKG2051	M 2.05K OHM G 1/4W
R476	ERDS2TJ822	C 8.2K OHM J 1/4W
R477	ERDS2TJ222	C 2.2K OHM J 1/4W
R478	ERDS2TJ222	C 2.2K OHM J 1/4W
R479	ERDS2TJ222	C 2.2K OHM J 1/4W
R480	ERDS2TJ222	C 2.2K OHM J 1/4W
R481	ERDS2TJ103	C 10K OHM J 1/4W
R501	ERDS2TJ391	C 390 OHM J 1/4W
R503	ERDS2TJ223	C 22K OHM J 1/4W
R504	ERDS2TJ123	C 12K OHM J 1/4W
R505	ERDS2TJ123	C 12K OHM J 1/4W
R506	ERDS2TJ223	C 22K OHM J 1/4W
R507	ERD25FJ154K	C 150K OHM J 1/4W
R508	ERDS2TJ333	C 33K OHM J 1/4W
R509	ERDS2TJ822	C 8.2K OHM J 1/4W
R510	ERDS2TJ102	C 1K OHM J 1/4W
R511	EROS2CKF1202	M 12K OHM F 1/4W
R512	EROS2CKF1052	M 10.5K OHM F 1/4W
R513	ERDS2TJ472	C 4.7K OHM J 1/4W
R514	EROS2CKG5901	M 5.9K OHM G 1/4W
R516	ERDS2TJ273	C 27K OHM J 1/4W
R518	ERDS2TJ472	C 4.7K OHM J 1/4W
R519	EROS2CKF4642	M 46.4K OHM F 1/4W
R520	ERDS2TJ122	C 1.2K OHM J 1/4W
R521	ERD25FJ471K	C 470 OHM J 1/4W
R522	ERDS2TJ681	C 680 OHM J 1/4W
R523	ERG5SJ102	M 1K OHM J 5W
R524	ERDS2TJ472	C 4.7K OHM J 1/4W
R525	ERDS1FJ120	C 12 OHM J 1/2W
R526	ERDS2TJ682	C 6.8K OHM J 1/4W
R530	ERD25FJ1R0K	C 1 OHM J 1/4W
R531	EROS2CKF1002	M 10K OHM F 1/4W
R532	ERDS2TJ103	C 10K OHM J 1/4W
R533	ERDS2TJ104	C 100K OHM J 1/4W
R534	ERDS2TJ103	C 10K OHM J 1/4W
R535	EROS2CKF8252	M 82.5K OHM F 1/4W
R536	EROS2CKF5621	M 5.62K OHM F 1/4W
R537	ERDS2TJ471	C 470 OHM J 1/4W
R538	EROS2CKG2212	M 22.1K OHM G 1/4W
R539	ERO25CKG4422	M 44.2K OHM G 1/4W
R545	ERDS2TJ100	C 10 OHM J 1/4W
R546	ERDS2TJ100	C 10 OHM J 1/4W
R547	EROS2CKG1003	M 100K OHM G 1/4W
R548	ERDS2TJ222	C 2.2K OHM J 1/4W
R549	ERDS2TJ102	C 1K OHM J 1/4W
R551	EROS2CKF2102	M 21K OHM F 1/4W
R552	EROS2CKF2102	M 21K OHM F 1/4W
R553	ERDS2TJ472	C 4.7K OHM J 1/4W
R554	ERDS2TJ472	C 4.7K OHM J 1/4W
R555	EROS2CKF3162	M 31.6K OHM F 1/4W
R556	EROS2CKF1652	M 16.5K OHM F 1/4W
R557	ERDS2TJ824	C 820K OHM J 1/4W
R558	ERDS2TJ824	C 820K OHM J 1/4W
R559	ERQ1CJP1R0	F 1 OHM J 1W
R560	ERDS2TJ151	C 150 OHM J 1/4W

Ref.No.	Part No.	Description			
R561	ERDS2TJ151	C	150 OHM	J	1/4W
R562A	ERG3SJ221	M	220 OHM	J	3W
R562B	ERG3SJ221	M	220 OHM	J	3W
R563A	ERG3SJ221	M	220 OHM	J	3W
R563B	ERG3SJ221	M	220 OHM	J	3W
R564	ERDS2TJ472	C	4.7K OHM	J	1/4W
R565	ERDS2TJ472	C	4.7K OHM	J	1/4W
R568	ERDS2TJ272	C	2.7K OHM	J	1/4W
R569	ERDS2TJ182	C	1.8K OHM	J	1/4W
R570	ERDS2TJ562	C	5.6K OHM	J	1/4W
R571	ERDS2TJ393	C	39K OHM	J	1/4W
R572	ERDS2TJ104	C	100K OHM	J	1/4W
R573	ERD25FJ680K	C	68 OHM	J	1/4W
R577	ERD25FJ471K	C	470 OHM	J	1/4W
R578	ERDS1FJ682	C	6.8K OHM	J	1/2W
R581	EROS2CKF3012	M	30.1K OHM	F	1/4W
R582	EROS2CKF2152	M	21.5K OHM	F	1/4W
R583	ERDS2TJ474	C	470K OHM	J	1/4W
R584	ERDS2TJ562	C	5.6K OHM	J	1/4W
R585	ERDS2TJ272	C	2.7K OHM	J	1/4W
R586	ERG2ANJ330	M	33 OHM	J	2W
R587	ERDS2TJ472	C	4.7K OHM	J	1/4W
R589	ERDS2TJ153	C	15K OHM	J	1/4W
R591	ERDS2TJ274	C	270K OHM	J	1/4W
R592	ERDS2TJ184	C	180K OHM	J	1/4W
R601	ERDS2TJ153	C	15K OHM	J	1/4W
R602	ERDS2TJ473	C	47K OHM	J	1/4W
R603	EROS2CKG2671	M	2.67K OHM	G	1/4W
R604	EROS2CKG8662	M	86.6K OHM	G	1/4W
R605	ERDS2TJ104	C	100K OHM	J	1/4W
R606	ERDS2TJ822	C	8.2K OHM	J	1/4W
R607	ERDS2TJ103	C	10K OHM	J	1/4W
R650	EROS2CKG8252	M	82.5K OHM	G	1/4W
R651	EROS2CKF2322	M	23.2K OHM	F	1/4W
R652	ERO25CKG2802	M	28K OHM	G	1/4W
R653	EROS2CKG1051	M	1.05K OHM	G	1/4W
R750	ERDS2TJ472	C	4.7K OHM	J	1/4W
R751	ERDS2TJ333	C	33K OHM	J	1/4W
R752	ERDS2TJ393	C	39K OHM	J	1/4W
R753	ERDS2TJ393	C	39K OHM	J	1/4W
R754	EROS2CKG4422	M	44.2K OHM	G	1/4W
R755	ERDS2TJ472	C	4.7K OHM	J	1/4W
R756	ERDS2TJ822	C	8.2K OHM	J	1/4W
R757	ERDS2TJ223	C	22K OHM	J	1/4W
R758	ERDS2TJ102	C	1K OHM	J	1/4W
R759	ERDS2TJ681	C	680 OHM	J	1/4W
R761	EROS2CKG1002	M	10K OHM	G	1/4W
R762	ERDS2TJ102	C	1K OHM	J	1/4W
R764	ERDS2TJ102	C	1K OHM	J	1/4W
R765	EROS2CKG1371	M	1.37K OHM	G	1/4W
R766	EROS2CKG6340	M	634 OHM	G	1/4W
R767	EROS2CKF1002	M	10K OHM	F	1/4W
R768	EROS2CKF5620	M	562 OHM	F	1/4W
R769	EROS2CKG1821	M	1.82K OHM	G	1/4W
R770	EROS2CKG1002	M	10K OHM	G	1/4W
R771	EROS2CKG1002	M	10K OHM	G	1/4W
⚠ R801	ERF10ZYK3R3	W	3.3 OHM	K	10W
R802	ERW2PKR33	W	0.33 OHM	K	2W
R804	ERDS2TJ561	C	560 OHM	J	1/4W
R805A	ERDS1FJ274	C	270K OHM	J	1/2W
R805B	ERDS1FJ224	C	220K OHM	J	1/2W
R806A	ERG3ANJ151	M	150 OHM	J	3W

Ref.No.	Part No.	Description			
R806B	ERG3ANJ151	M	150 OHM	J	3W
R807	ERG2ANJ563	M	56K OHM	J	2W
R808A	ERG3ANJ680	M	68 OHM	J	3W
R808B	ERG3ANJ680	M	68 OHM	J	3W
R809	ERD25FJ561K	C	560 OHM	J	1/4W
R810	ERD25FJ330K	C	33 OHM	J	1/4W
R811	ERC12AGK474	S	470K OHM	K	1/2W
R821	ERD25FJ474K	C	470K OHM	J	1/4W
R822	ERD25FJ474K	C	470K OHM	J	1/4W
R841	ERD25FJ101K	C	100 OHM	J	1/4W
⚠ R842	EROS2CKF2743	M	274K OHM	F	1/4W
R843	EROS2CKF1213	M	121K OHM	F	1/4W
R851	ERDS2TJ124	C	120K OHM	J	1/4W
R852	ERDS2TJ104	C	100K OHM	J	1/4W
R854	ERDS2TJ100	C	10 OHM	J	1/4W
R855	ERDS2TJ103	C	10K OHM	J	1/4W
R856	ERDS2TJ122	C	1.2K OHM	J	1/4W
R858	ERD25FJ390K	C	39 OHM	J	1/4W
R859	ERDS1FJ470	C	47 OHM	J	1/2W
⚠ R867	ERQ14AJ1R0	F	1 OHM	J	1/4W
⚠ R868	ERQ14AJ1R0	F	1 OHM	J	1/4W
⚠ R869	ERQ12AJ1R0	F	1 OHM	J	1/2W
⚠ R870	ERQ12AJ1R0	F	1 OHM	J	1/2W
⚠ R872	ERQ2CKPR33	F	0.33 OHM	K	2W
R873	ERF5ZYK3R3	W	3.3 OHM	K	5W
⚠ R882	ERQ12HKR47	F	0.47 OHM	K	1/2W
R885	ERD25FJ124K	C	120K OHM	J	1/4W
R886	ERG1ANJ820	M	82 OHM	J	1W
R887	ERDS2TJ100	C	10 OHM	J	1/4W
R888	ERDS2TJ183	C	18K OHM	J	1/4W
R889	ERD2FCG222	C	2.2K OHM	G	2W
R890	ERDS2TJ333	C	33K OHM	J	1/4W
R891	ERDS2TJ104	C	100K OHM	J	1/4W
R1301	ERO25CKF75R0	M	75 OHM	F	1/4W
R1302	ERO25CKF75R0	M	75 OHM	F	1/4W
R1303	ERO25CKF75R0	M	75 OHM	F	1/4W
R1304	ERD25TC0	C	0 OHM		1/4W
R1305	ERDS2TJ124	C	120K OHM	J	1/4W
R1307	ERDS2TJ101	C	100 OHM	J	1/4W
R1308	ERDS2TJ101	C	100 OHM	J	1/4W
R1309	ERD25FJ102K	C	1K OHM	J	1/4W
R1310	ERD25FJ102K	C	1K OHM	J	1/4W
R1311	ERD25FJ102K	C	1K OHM	J	1/4W
R1312	ERD25FJ102K	C	1K OHM	J	1/4W
R1313	ERD25FJ102K	C	1K OHM	J	1/4W
R1314	ERD25FJ102K	C	1K OHM	J	1/4W
R1324	ERO25CKF2700	M	270 OHM	F	1/4W
R1325	ERO25CKF2700	M	270 OHM	F	1/4W
R1326	ERO25CKF2700	M	270 OHM	F	1/4W
R1327	ERO25CKF2700	M	270 OHM	F	1/4W
R1328	ERO25CKF2700	M	270 OHM	F	1/4W
R1329	ERO25CKF2700	M	270 OHM	F	1/4W
R1330	ERDS2TJ560	C	56 OHM	J	1/4W
R1331	ERD25FJ103K	C	10K OHM	J	1/4W
R1332	ERD25FJ103K	C	10K OHM	J	1/4W
R1333	ERD25FJ103K	C	10K OHM	J	1/4W
R1334	ERD25FJ103K	C	10K OHM	J	1/4W
R1335	ERD25FJ103K	C	10K OHM	J	1/4W
R1336	ERDS2TJ562	C	5.6K OHM	J	1/4W
R1337	ERDS2TJ332	C	3.3K OHM	J	1/4W
R1338	ERDS2TJ332	C	3.3K OHM	J	1/4W
R1340	ERDS2TJ222	C	2.2K OHM	J	1/4W

Ref.No.	Part No.	Description				Ref.No.	Part No.	Description			
R1341	ERDS2TJ222	C	2.2K	OHM	J 1/4W	R1418	ERDS2TJ122	C	1.2K	OHM	J 1/4W
R1342	ERDS2TJ123	C	12K	OHM	J 1/4W	R1419	ERDS2TJ562	C	5.6K	OHM	J 1/4W
R1343	ERDS2TJ123	C	12K	OHM	J 1/4W	R1421	ERD25FJ152K	C	1.5K	OHM	J 1/4W
R1346	ERDS2TJ331	C	330	OHM	J 1/4W	R1422	ERDS2TJ104	C	100K	OHM	J 1/4W
R1347	ERDS2TJ473	C	47K	OHM	J 1/4W	R1423	ERDS2TJ273	C	27K	OHM	J 1/4W
R1348	ERDS2TJ563	C	56K	OHM	J 1/4W	R1424	ERDS2TJ222	C	2.2K	OHM	J 1/4W
R1349	ERDS2TJ223	C	22K	OHM	J 1/4W	R1425	ERDS2TJ561	C	560	OHM	J 1/4W
R1350	ERDS2TJ471	C	470	OHM	J 1/4W	R1426	ERDS2TJ122	C	1.2K	OHM	J 1/4W
R1351	ERDS2TJ104	C	100K	OHM	J 1/4W	R1429	ERD25FJ560K	C	56	OHM	J 1/4W
R1352	ERDS2TJ102	C	1K	OHM	J 1/4W	R1430	ERDS2TJ122	C	1.2K	OHM	J 1/4W
R1354	ERDS2TJ562	C	5.6K	OHM	J 1/4W	R1431	ERDS2TJ823	C	82K	OHM	J 1/4W
R1355	ERDS2TJ333	C	33K	OHM	J 1/4W	R1432	ERDS2TJ183	C	18K	OHM	J 1/4W
R1357	EROS2CKF3161	M	3.16K	OHM	F 1/4W	R1433	ERDS2TJ122	C	1.2K	OHM	J 1/4W
R1358	ERDS2TJ332	C	3.3K	OHM	J 1/4W	R3340	ERG5ZXJ821	M	820	OHM	J 5W
R1359	EROS2CKF3401	M	3.4K	OHM	F 1/4W	R3341	ERG5ZXJ821	M	820	OHM	J 5W
R1360	ERDS2TJ822	C	8.2K	OHM	J 1/4W	R3342	ERG5ZXJ821	M	820	OHM	J 5W
R1361	ERDS2TJ472	C	4.7K	OHM	J 1/4W	R3343	ERDS2TJ101	C	100	OHM	J 1/4W
R1362	ERDS2TJ223	C	22K	OHM	J 1/4W	R3344	ERDS2TJ101	C	100	OHM	J 1/4W
R1363	ERDS2TJ223	C	22K	OHM	J 1/4W	R3345	ERDS2TJ101	C	100	OHM	J 1/4W
R1365	EROS2CKG6491	M	6.49K	OHM	G 1/4W	R3346	ERDS2TJ330	C	33	OHM	J 1/4W
R1366	EROS2CKG5361	M	5.36K	OHM	G 1/4W	R3347	ERDS2TJ330	C	33	OHM	J 1/4W
R1367	EROS2CKG6801	M	6.8K	OHM	G 1/4W	R3348	ERDS2TJ330	C	33	OHM	J 1/4W
R1368	EROS2CKG8201	M	8.2K	OHM	G 1/4W	R3349	ERDS2TJ330	C	33	OHM	J 1/4W
R1369	EROS2CKG6491	M	6.49K	OHM	G 1/4W	R3350	ERDS2TJ330	C	33	OHM	J 1/4W
R1370	EROS2CKG5361	M	5.36K	OHM	G 1/4W	R3351	ERDS2TJ330	C	33	OHM	J 1/4W
R1371	ERDS2TJ823	C	82K	OHM	J 1/4W	R3352	ERDS2TJ220	C	22	OHM	J 1/4W
R1372	ERDS2TJ823	C	82K	OHM	J 1/4W	R3353	ERDS2TJ220	C	22	OHM	J 1/4W
R1373	ERD25FJ823K	C	82K	OHM	J 1/4W	R3354	ERDS2TJ220	C	22	OHM	J 1/4W
R1374	ERDS2TJ222	C	2.2K	OHM	J 1/4W	R3355	ERDS2TJ473	C	47K	OHM	J 1/4W
R1375	ERDS2TJ221	C	220	OHM	J 1/4W	R3356	ERDS2TJ473	C	47K	OHM	J 1/4W
R1376	ERDS2TJ124	C	120K	OHM	J 1/4W	R3357	ERDS2TJ473	C	47K	OHM	J 1/4W
R1377	ERDS2TJ562	C	5.6K	OHM	J 1/4W	R3361	ERD25FJ101K	C	100	OHM	J 1/4W
R1379	ERDS2TJ471	C	470	OHM	J 1/4W	R3362	ERD25FJ101K	C	100	OHM	J 1/4W
R1380	ERDS2TJ471	C	470	OHM	J 1/4W	R3363	ERD25FJ101K	C	100	OHM	J 1/4W
R1381	ERDS2TJ471	C	470	OHM	J 1/4W	R3364	ERD25FJ101K	C	100	OHM	J 1/4W
R1382	ERDS2TJ151	C	150	OHM	J 1/4W	R3365	ERD25FJ101K	C	100	OHM	J 1/4W
R1383	ERDS2TJ151	C	150	OHM	J 1/4W	R3366	ERD25FJ101K	C	100	OHM	J 1/4W
R1384	ERDS2TJ151	C	150	OHM	J 1/4W	R3367	ERDS2TJ181	C	180	OHM	J 1/4W
R1385	ERDS2TJ151	C	150	OHM	J 1/4W	R3368	ERDS2TJ271	C	270	OHM	J 1/4W
R1386	ERDS2TJ151	C	150	OHM	J 1/4W	R3369	ERDS2TJ563	C	56K	OHM	J 1/4W
R1387	ERDS2TJ151	C	150	OHM	J 1/4W	R3370	ERDS2TJ224	C	220K	OHM	J 1/4W
R1388	ERDS2TJ154	C	150K	OHM	J 1/4W	R3371	ERDS2TJ221	C	220	OHM	J 1/4W
R1389	EROS2CKF3401	M	3.4K	OHM	F 1/4W	R3372	ERDS2TJ224	C	220K	OHM	J 1/4W
R1390	ERDS2TC0	C	0	OHM	1/4W	R3373	ERDS2TJ221	C	220	OHM	J 1/4W
R1391	ERDS2TJ822	C	8.2K	OHM	J 1/4W	R3374	ERD25FJ224K	C	220K	OHM	J 1/4W
R1392	ERD25TC0	C	0	OHM	1/4W	R3375	ERD25FJ221K	C	220	OHM	J 1/4W
R1393	ERDS2TJ273	C	27K	OHM	J 1/4W	R3378	ERD25FJ820K	C	82	OHM	J 1/4W
R1395	ERDS2TJ273	C	27K	OHM	J 1/4W	R3379	ERDS2TJ102	C	1K	OHM	J 1/4W
R1396	ERDS2TJ182	C	1.8K	OHM	J 1/4W	R3380	ERDS1FJ153	C	15K	OHM	J 1/2W
R1397	ERDS2TJ273	C	27K	OHM	J 1/4W	R3381	ERG1ANJ473	M	47K	OHM	J 1W
R1398	ERDS2TJ182	C	1.8K	OHM	J 1/4W	R3382	ERDS2TJ750	C	75	OHM	J 1/4W
R1399	ERDS2TJ682	C	6.8K	OHM	J 1/4W	R3383	ERDS2TJ750	C	75	OHM	J 1/4W
R1402	ERD25FJ182K	C	1.8K	OHM	J 1/4W	R3384	ERDS2TJ750	C	75	OHM	J 1/4W
R1403	ERDS2TJ122	C	1.2K	OHM	J 1/4W	R3390	ERDS1FJ151	C	150	OHM	J 1/2W
R1404	ERDS2TJ223	C	22K	OHM	J 1/4W	R3391	ERDS1FJ151	C	150	OHM	J 1/2W
R1405	ERD25FJ821K	C	820	OHM	J 1/4W	R3392	ERDS1FJ151	C	150	OHM	J 1/2W
R1406	ERDS2TJ822	C	8.2K	OHM	J 1/4W	R3393	ERD50FJ151	C	150	OHM	J 1/2W
R1407	ERDS2TJ224	C	220K	OHM	J 1/4W	R3394	ERDS2TJ101	C	100	OHM	J 1/4W
R1409	ERD25FJ393K	C	39K	OHM	J 1/4W	R3395	ERD25FJ101K	C	100	OHM	J 1/4W
R1410	ERD25FJ561K	C	560	OHM	J 1/4W	R3396	ERDS2TJ101	C	100	OHM	J 1/4W
R1411	ERTD2FHL142S	THERMISTOR				R3397	ERD25FJ104K	C	100K	OHM	J 1/4W
R1416	ERDS1FJ121	C	120	OHM	J 1/2W	R3398	ERD25FJ104K	C	100K	OHM	J 1/4W

	Ref.No.	Part No.	Description
	R3399	ERD25FJ104K	C 100K OHM J 1/4W
		OTHERS	
		TJE81101	TERMINAL
		TJE81110	TERMINAL
		TJE81132	TERMINAL
	49	TMK87908	CONNECTION BOARD
		TMM81416	CORD BAND(SMALL)
		TMM81460	LOCKING SUPPORT
	50	TMM85416	RUBBER(LOKING SUPORT)
		TMM85517-1	MARK BAND(R)
		TMM85517-2	MARK BAND(G)
		TMM85517-3	MARK BAND(B)
		TMM87701	BUSHING
		TMM87702	COLLAR
⚠		TQF85617	FUSE EXCHANGE LABEL
⚠		TQF85745	FUSE EXCHANGE LABEL
	51	TSC8906-0	FERRITE CORE(BIG)
	52	TUC85981-1	SHIELD CASE COVER(AC)
	53	TUC87532	SHIELD PLATE(IC)
		TUX80701-2	CORD BRACKET(BIG)
	54	TUX87108-1	SHIELD CASE(AC)
	55	TUX87116	3P SOCKET BRACKET
⚠	56	TXAJTA3P1427	3P CONNECTOR ASSY
		TXAJTE3P1330	3P CONNECTOR ASSY
		TXAJTE4P589	4P CONNECTOR ASSY
		TXAJTE8P089	8P CONNECTOR ASSY
	57	XNG3BS	NUT
		XSN3+10S	SCREW
		XTV3+10C	SCREW
		XTV3+12C	SCREW
		XTV3+20J	SCREW
	58	XTV3+6C	SCREW
	59	XTV3+8C	SCREW
		XTV3+8F	SCREW
	60	XWA3B	WASHER
		XWC3BFN	WASHER
		XWGT40660	WASHER
		XWG3F10	WASHER
		XYA4+EF8	SCREW
		XYE3+EC8	SCREW
		XYE3+EF8	SCREW
		XYN3+C10	SCREW
	CN102A	TXAJTE12P051	12P CONNECTOR ASSY
	CN102B	TJS878312	12P CONNECTOR
	CN303-	TXAJTE3P1248	3P CONNECTOR ASSY
	CN304-	TXAJTE5P320A	5P CONNECTOR ASSY
	CN305A	TXAJTE4P587A	4P CONNECTOR ASSY
	CN305B	TJS878204	4P SOCKET
	CN306-	TXAJTE3P1329	3P CONNECTOR ASSY
	CN401A	TXAJTE7P060	7P CONNECTOR ASSY
	CN401B	TJS878307	7P SOCKET
	CN501A	TXAJTE6P437	6P CONNECTOR ASSY
	CN501B	TJS878306	6P SOCKET
	CN502A	TXAJTE5P319	5P CONNECTOR ASSY
	CN502B	TJS878305	5P CONNECTOR
	CN503A	TXAJTE5P354	5P CONNECTOR ASSY
	CN503B	TJS878305	5P CONNECTOR
	CN504	TJS878203	3P SOCKET
	CN1301	TJS878209	9P SOCKET
	CN1304	TJS878203	3P SOCKET
	CN1305	TJS878208	8P SOCKET

	Ref.No.	Part No.	Description
	CN1306	TJS878204	4P SOCKET
	CN3303	TJS878205	5P SOCKET
	CN3304	TJS878203	3P SOCKET
	CN3305	TJS8A4180	SOCKET
	CN3306	TJS8A4180	SOCKET
	CN3307	TJS8A4180	SOCKET
	D1	TEL302-9	TERMINAL
	D2	TEL302-9	TERMINAL
	D3	TEL302-9	TERMINAL
	D4	TEL302-9	TERMINAL
	D3301	TEL302-9	TERMINAL
	D3302	TEL302-9	TERMINAL
⚠	F801	XBA2C31TROA	FUSE
	FS802	TJC3316	FUSE HOLDER
	FS803	TJC3316	FUSE HOLDER
	H1	TEL302-9	TERMINAL
	H2	TEL302-9	TERMINAL
	JC1301	TJC6137	GNA TERMINAL
	JC1302	TJC6137	GNA TERMINAL
	JC1303	TJC6137	GNA TERMINAL
	JC1304	TJC6137	GNA TERMINAL
⚠	JS3301	TJS8A505	CRT SOCKET
	S3390	TAGDSP301NT	SPARK GAP
	S3391	TAGDSP301NT	SPARK GAP
	S3392	TAGDSP301NT	SPARK GAP
	S3393	TAGDSP301NT	SPARK GAP
	S3394	TGPS152GL	SPARK GAP
	S3395	TAGDSP301NT	SPARK GAP
	SW501	EVQR1AL13	SWITCH
	SW1301	TSE80735	SWITCH
	SW1302	TSE80373	SWITCH
	SW1303	TSE80948	SWITCH
	SW1304	TSE80373	SWITCH
	V1	TEL302-9	TERMINAL
	V2	TEL302-9	TERMINAL
	V1301-	TWHZZ2035	PHONO PIN CABLE
	V1302-	TWHZZ2035	PHONO PIN CABLE
	V1303-	TWHZZ2040	PHONO PIN CABLE
	X3301	TAXNFV506S	CR COMBINATION
	X3302	TAXNFV506S	CR COMBINATION
	X3303	TAXNFV506S	CR COMBINATION